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ABSTRACT

This report describes the North Carolina Department of Education's 5-year plan for establishing a statewide management information system. The system is intended to improve fiscal management, personnel administration, and administrative operations, and to ensure efficient resource use. Initial sections present highlights of the plan; background information and a summary of objectives and scope; technical and organizational deficiencies the plan should remedy; and specific types of information needed by the department, by school districts and schools, and by external agencies. The report then describes strategies for executing the plan--supplementing existing hardware, changing some management practices, and ensuring data security--and summarizes the plan's component projects. Finally, the next two sections describe, first, the plan's schedule, development procedures, and estimated costs; and second, measures needed to ensure the plan's success. Appendixes contain (1) a membership list for the committee that produced this report; (2) cost and effort schedules; (3) descriptions of 18 specific projects, with a diagram showing their relationships; (4) a summary of the approach used to estimate efforts and costs; and (5) a list of proposed hardware and communications links. (MCG)

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INTEGRATED SYSTEMS FOR EDUCATION INFORMATION

A BUSINESS PLAN FOR MANAGING NORTH CAROLINA'S PUBLIC SCHOOL SYSTEM

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INTEGRATED SYSTEMS FOR EDUCATION INFORMATION

A BUSINESS PLAN FOR MANAGING
NORTH CAROLINA'S
PUBLIC SCHOOL SYSTEM

MANAGEMENT SUMMARY REPORT

RESULTS OF AN
INFORMATION PLANNING PROJECT
FOR THE CONTROLLER'S OFFICE OF THE
NORTH CAROLINA DEPARTMENT OF PUBLIC EDUCATION

MARCH, 1984

INTEGRATED SYSTEMS FOR EDUCATION INFORMATION

MANAGEMENT SUMMARY REPORT

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INFORMATION PLANNING PROJECT

MANAGEMENT SUMMARY

INTRODUCTION

The North Carolina State Department of Public Education (DPE) has developed a comprehensive Information Plan to develop integrated systems for education information. The Plan addresses the information systems requirements necessary to meet the diverse and complex management and administrative needs of the local education agencies (LEAs), the state education agency and the entities to which they are responsible. The Plan provides a framework for systems development and implementation, hardware and software direction, information processing organization, and other activities necessary to achieve support for financial, personnel, educational program and operational management objectives for the state public school system. The Plan will also help ensure that all systems development efforts will be organized and coordinated; will be performed in a logical, orderly sequence; and will result in well planned, integrated, and compatible management planning and reporting activities.

The need for a major systems effort is a result of assessing the information management systems of the DPE and a confirmation that DPE does not provide adequate information processing support for the LEAs. The DPE systems are technologically obsolete, functionally outmoded, and unable to provide timely, relevant, and accurate data to produce critical management planning and control information. The deficiencies of the existing systems are pervasive; they adversely influence performance of financial management, personnel accountability, administrative operations, and educational program planning and monitoring activities.

This project has resulted in a comprehensive plan which, when implemented will substantially enhance the capability of the Controller to fulfill his responsibilities. In addition, it addresses key service opportunities to the state and local education agencies. This Plan is both pragmatic and far-reaching. Full implementation will require three to five years; however, specific benefits should be realized during the course of implementation starting as early as the 1984-85 school year.

The cost of implementing the Plan will approximate \$4 per ADM per year during the time of implementation. Over the course of the project it should not exceed one fourth of one percent of the total public school system state budget for that period.

HIGHLIGHTS OF THE PLAN

Development of integrated systems for education information is a major overall initiative addressing various significant management problems of the North Carolina Department of Public Education and the local education agencies (LEAs). There are different initiatives within the scope of the Plan causing the number of projects to be many and the effort involved to be significant. The Plan covers five years and recommends eighteen projects with the most significant efforts occurring in the first eighteen months.

The Plan provides for implementing a state education information network using information from existing LEA systems, providing new systems for additional areas of need in schools and LEAs and upgrading technology and existing systems within the Department of Public Education in Raleigh. The integrated systems plan for education information addresses management information, business methods, technology, administrative aids and technical support.

Management Information

The Plan addresses a specific need for more timely and accurate information for fiscal management, educational program management, and professional personnel positions management by both DPE and LEAs. In many cases, the information is currently available but not in a timely or workable format for reporting or analysis.

Business Methods

The Plan provides for a change in the approach of the Controller's Office to meet its legal responsibilities. The ability to meet the legal responsibilities currently suffers from system and information weaknesses. The change in approach to address this problem includes emphasis on overall management reporting and reliance on a substantive single audit program at the LEA level to replace much of the detailed monthly audit and review process currently in use by the DPE. The change in methods should result in less effort to conduct business at the LEA and state level; this reduction in effort will be made possible through more current and accurate information which should be available from the LEAs as the systems are integrated.

Technology

State of the art technical capabilities will be used in a responsible manner to achieve the objectives of integrated systems. Technological improvements include a communications network to the LEAs and potentially to the schools; use of microcomputers at all the LEAs to share information and do local processing; integration of the microcomputer systems with the existing LEA computers; and use of state of the art software tools at DPE for analytical purposes and for meeting information needs of external agencies.

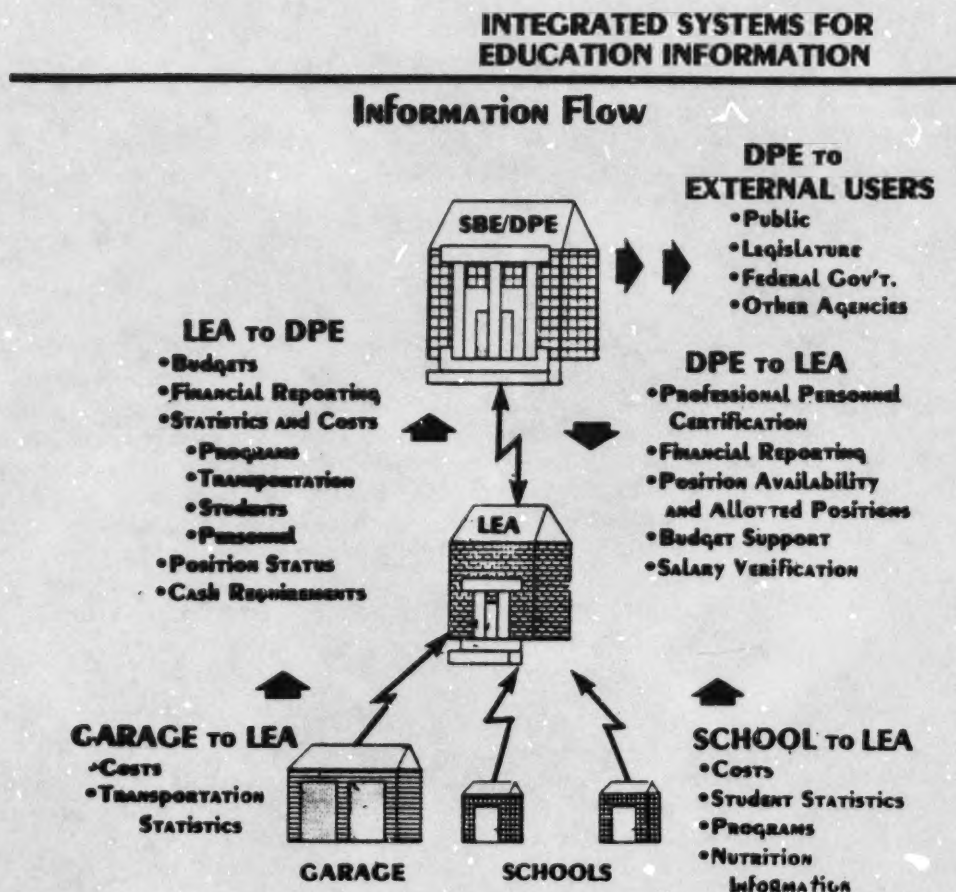
Administrative Aids

Projects in the Plan also include efforts to address the administrative workload at the school and LEA level. These projects should provide access to more timely information through the use of office automation techniques and systems to do calculations and reporting which otherwise would

be done manually. The proposed Student Information Management System is an example of a project to provide administrative support.

Technical Support

Several initiatives in the Plan address existing commitments by the Controller's Office for technical support to the LEAs as well as expanded support in areas where there is a current void of technical guidance and support for the LEAs. In addition, each system design will emphasize strong user tools for dealing with technical and operational needs in order to minimize the amount of user action and technical expertise necessary to work with the systems. To help ensure good results in implementing the Plan, several preparatory activities will have to be conducted to provide the desired technical support features.



BACKGROUND AND APPROACH

Preparation of the Plan

The Controller established a Management Advisory Committee (MAC) to provide overall direction for this Information Planning Project. The MAC is made up of a broad representation of LEAs and state agencies to ensure responsiveness of the study to the various needs and to approve findings, conclusions and recommendations. (See Appendix A for a detailed listing of MAC members). The State Board of Education engaged Arthur Andersen & Co., upon the recommendation of the MAC, to assist in this undertaking.

The project was conducted over a period of four months. Input to the project team was achieved through extensive interviews and field trips. Representatives of the following organizations were included:

- . Controller's Office
- . Department of Public Instruction
- . LEAs of varying sizes and technical information processing environments
- . Department of Administration
- . Office of State Budget and Management
- . Department of State Treasurer
- . Department of State Auditor
- . Various Hardware/Software Vendors

Project results were presented to the MAC at key checkpoints, with approval of the results of the study in concept given at the February 9 MAC meeting.

Objectives and Scope

The original stated project objectives did not change throughout the information gathering and analysis. These objectives were to develop an information plan which, when implemented, would:

- . Improve Fiscal Management
- . Support Personnel Administration
- . Enhance Administrative Operations
- . Ensure Efficient, Cost-Effective Use of Resources
- . Provide More Relevant and Timely Management Information

Currently the ability of the Controller's Office to meet its legal responsibilities suffers from the systems and information weaknesses described in this report. The fundamental need addressed in the plan is to provide the tools for the Controller's Office to fulfill the legal obligations outlined in G.S.115C-29. These include:

- . Accurate current and end-of-year projections of fund status against budget.
- . Accurate fund allotment reporting ensuring adequate teacher staffing without exceeding budgets.
- . Accurate salary and cash requirements projections.
- . Timely initial certification and subsequent verification of individual salaries paid.
- . Effective fiscal management of education dollars, ensuring:
 - Expenditures are as authorized
 - Allocations are equitable
 - Resources are used efficiently and effectively
- . Timely compliance with State and Federal Reporting Requirements.

The Plan directly addresses information needs of the DPE Controller's Office and the LEAs. Since a major responsibility of the Controller's Office is to furnish information, the Plan also addresses key information needs for the Legislature, the Department of Public Instruction (DPI), other state agencies and the public.

The needs of the LEAs are addressed in the Plan as follows:

- . The information requirements of the DPE are generally filled by the LEAs. The Plan provides support to the LEAs in areas where meeting DPE requirements involves highest impact. Several projects, including a Student Information Management System, serve a dual role of supporting LEA needs and providing information to the Department.
- . Several projects in the Plan specifically address data processing needs of the LEAs and schools on a service basis, with little direct benefit deriving to the DPE or other state agencies. Assistance at the local level will fill a void of technical competence needed for future acquisition of more advanced technologies within the LEAs and their schools. Support for LEAs to supplement limited in-house technical resources is consistent with the historical advisory and assistance role for the DPE with respect to the LEAs.
- . Two specific projects address prior commitments for technical support by DPE for the LEAs. The projects are to raise the level of technical support currently available and to help ensure adequate support in these areas on an ongoing basis.

FINDINGS

Quality of Information

The problem of lack of timeliness, accuracy and usability of management information at the DPE is genuine and very significant. There are multiple causes of the information quality problem, resulting from the way information is obtained, stored and disseminated. In some cases, adequate information is not available; but in most cases, the information does exist at the Department of Public Education but is not sufficiently accurate, is not obtained in a sufficiently timely basis, or is not in a format that can be used for analytical or management decision purposes.

The following major information-related problems were observed:

- . Information from the LEAs is not always available on a timely basis. This is not entirely an LEA problem. It is partially a function of the cumbersome DPE techniques for surveying information from the LEAs. There is significant reliance on manual procedures and on survey techniques to obtain data. Existing personnel, student, and other information that may be on record at the LEAs or DPE cannot be accessed. A specific example is the Professional Personnel Activity Report (PPAR) which documents key information about teachers which is processed annually in the fall. Processing requires several months of effort, consequently delaying availability of complete information to the extent that it often becomes untimely and less useful than it should be.
- . The DPE is not timely in returning key information to the LEAs. In particular, teacher certification and salary verification information is not available to the LEA in time for accurately setting a teacher's salary prior to the initial pay period. This delay results in changes to salaries paid on a retroactive basis, for periods of two to three months or longer.
- . The DPE is often not able to furnish key information such as class size, exceptional children and other program information to appropriate external agencies such as the Legislature. This deficiency is primarily a result of problems in accuracy and timeliness of information. Part of the problem with respect to timeliness is caused by a lack of accuracy of that information submitted by the LEAs. This problem is particularly acute for reporting financial information. Significant audit exceptions and other problems in the financial reporting from the LEAs require that the financial reports be audited in detail prior to consolidation and dissemination of the financial statements.
- . Information that is stored at DPE is stored in archaic, inconsistent systems that are not responsive or flexible to additional requirements or analytical needs. In many cases, the necessary information exists in the Department but cannot be accessed or consolidated in the manner required.

- . The information problems lead to lack of confidence of external agencies in the capabilities of the Controller's Office and a lack of confidence and mutual trust between the Controller's Office and the LEAs.

Despite the problems of quality of information, the demand for better and more timely information by external users is clearly valid and is not overstated. The key external users in addition to the Legislature include the Office of Budget and Management, State Auditor, State Treasurer, and numerous public organizations.

Organizational Relations of DPE, LEAs, Others

A complicating factor for successful systems effort to integrate state and local systems is the conflicting policies and goals of the various agencies. The DPE, in particular the Controller's Office, must respond to dictates and legislative requirements at the state level. The LEAs in turn, while being as responsive as possible to the state, must also be responsive to local governments and commissions and to pressures brought about in the local public interest.

Relations between the Controller's Office and the LEAs are apparently significantly better at the present time than in the past; however, the improved relationship must rely on a continued high level of communication and building of mutual trust and confidence.

Additional observations about the organizational environment for the project to integrate systems for education information are the following:

- . Business practices and procedures across the LEAs are diverse. This variety is a natural result of the high level of autonomy necessarily afforded to the LEAs and the response of the LEAs to the local business practices of their respective city or county governments and commissions.
- . The existing information processing environment at the LEA level cannot be changed quickly. The amount and variety of computer hardware, diversity of technical skills, management perspective and local pressures, in addition to the significant costs involved, preclude revolutionary change in the basic information processing environments of computer hardware and software. For a plan to have significant results across LEAs within the next few years, it will be necessary to provide a framework of information sharing around the existing systems rather than to anticipate a wholesale change of those systems.
- . A current lack of confidence in the ability of DPE to conduct major systems efforts results from, among other things, an apparent inability to meet prior commitments for data processing services. A specific example is the prior commitment of the Controller's Office to provide technical programming services for the LEA Computer Project. With the understanding that the Controller's Office would provide necessary software development and maintenance support, over sixty LEAs have purchased Burroughs computers

over the past four years, using local funds. An essential part of the Plan is to address these prior commitments and to upgrade the technical resources sufficiently so that these commitments can be met. This increase in the level of competence for key technical areas is a necessary process to build confidence in the capabilities of the Department of Public Education to respond to LEA needs and to meet its commitments.

Information Systems Status - DPE

The current information systems of the Department are technologically obsolete, contain redundant information and lack the flexibility to respond to outside information requests and internal needs. Outmoded systems cause a problem in management for the DPE and indirectly impact the LEAs through redundant requests for information. It is clearly impossible to achieve the objectives of the Plan within the existing framework of information systems.

Information System Status - LEAs

Not surprisingly, there are significantly varying degrees of automation and types of hardware and software at the LEAs. In addition, a substantial number of LEAs have no automated business systems. As previously mentioned, it is a challenge for the education information network to be integrated with the variety of existing computers and non-automated environments.

With respect to computer software, the LEAs tend to struggle with the selection and implementation of major new applications. In addition, there are simultaneous projects conducted in the same functional areas across LEAs where the requirements for the systems are very similar. For example, many LEAs have addressed student attendance tracking. An important aspect of the plan is for DPE to conduct or coordinate projects that can offer a common solution to address the needs of many, if not most, LEAs.

Internal DPE Organization and Environment

The DPE has initiated several worthwhile projects to improve the quality of information and to reduce LEA workload. These initiatives are integrated with the major systems provided by this Plan.

The need to define the mission of the DPE information processing function better has been started with proposed policies and organization in the Plan. The DPE provides a variety of services to the LEAs and external agencies. As a result, available resources of the DPE are spread thinly. The Plan contains specific recommendations to address the problem of the lack of technical resources within the Department of Public Education.

In the area of information processing organization, the data processing staff is dedicated and enthusiastic about its work and is competent in basic information processing skills. However, the archaic technical environment of the DPE, which provides the basis for the staff's level of technical skills, has inhibited development of state of the art techniques and skills. A process of upgrading staff skills and the overall data processing organization within DPE is a key area of initiative of this Plan.

INFORMATION NEEDS

Controller's Office and Department of Public Education

Implementation of the Plan would address the following critical management needs of the Controller's Office and the Department of Public Instruction:

- Accurate monthly financial statements comparing expenditures and encumbrances with monthly budgets for improved financial management.
- Accurate projections of salary and expense requirements for cash management, expenditure control, analysis of potential end of year position against allotments, budgets and approximations.
- Timely salary verification for ensuring accurate payroll processing.
- Responsive and timely reporting for local, state, and federal funds for meeting fiscal responsibilities.
- Control of allotted teacher positions for ensuring the correct salary is paid for certified employees.
- Key personnel information for administering professional personnel certification and assignment regulations, projecting qualification requirements, preparing education program staffing statistics, and performing various analyses in response to Legislative and State Board of Education requests.
- Program and per pupil costs for educational programs, especially exceptional children programs. Cost accounting for programs should identify major cost components and variances of cost components with all applicable cost to programs being reported.
- Costs and statistics for major areas of expenditure besides personnel; in particular, this need exists in the area of student transportation.
- Comprehensive pupil and class information for projecting instructional personnel needs, allotting school system personnel, monitoring compliance with class size regulations and performing ADM and exceptional children headcount audits and managing educational programs.

Several of these critical needs are legislative mandates for the Controller's Office to perform, including the need for timely verification of salaries and current accurate budget status. The significant functional and technical weaknesses of the current systems preclude adequate fulfillment of these responsibilities by the Controller.

School and LEA Information Needs

The emphasis of the planning project is to meet the information needs of the Department of Public Education and to assist the LEAs and schools in doing so. The plan for integrated systems provides for addressing several areas of information for the LEAs and schools where there are significant needs common to most or all LEAs. These needs include:

- Comprehensive personnel information for administering personnel functions, planning staff requirements, complying with certification requirements, maintaining quality of instruction, and managing personnel resources and resulting expenditures.
- Comprehensive student and class information for monitoring educational programs, identify students requiring special attention, monitoring class size conditions, collecting and analyzing statistical and operational data, and projecting instructional personnel requirements.
- Timely information about position availability and current staffing.
- More timely information about key budgeting statistics to assist local agencies in preparing annual budgets with available state information.
- Improved management information about food inventories, portion sizes, and other cost information for meal programs as well as participation statistics for free and reduced price meal programs.
- Access to information submitted to DPE in order to manage the same areas at the local level.
- Basic business and financial information for performing day to day operations at the LEA and school levels.

External Agencies

The Department of Public Education has a responsibility and role to furnish necessary information to other agencies including the Legislature, the Office of Budget and Management, other state agencies and the public. This information includes program information, cost information by program and per pupil, current accurate information about projected personnel levels and projections of student membership. The Department must also have the ability to respond to specific information requests about the makeup of student or personnel groups within the education system of North Carolina.

PROPOSED STRATEGIES

Establish Integrated Systems for Education Information

A fundamental aspect of the Information Plan for integrated systems is the strategy for using technological tools to achieve the necessary improvements in management information by supplementing existing hardware and software at the DPE, LEA and school levels. This strategy of supplementing rather than replacing existing hardware and software was adopted for several reasons.

- . This strategy is based on a premise that the internal operating environment of an LEA has a certain degree of autonomy in business methods and techniques including information processing techniques. In addition, it recognizes that there are significant existing investments at the local level which would be extremely costly to replace.
- . Existing technology would allow information sharing and data communications across a variety of types of computer hardware. The integrated system strategy provides for the use of microcomputers to communicate with existing LEA mainframe and minicomputers, communicate with the State Computer Center for the Department of Public Education; and to do local processing for specific new applications.
- . This technical strategy which emphasizes microcomputers and communications is a more cost effective approach than replacing existing LEA computers and can be achieved in a much quicker timeframe.

In summary, the strategy provides for the following:

- . Replacing key technically outdated and functionally outmoded systems at the DPE.
- . Using advanced technical tools in Raleigh for information retrieval and analysis.
- . Upgrading selected present LEA systems which are not providing satisfactory service as necessary to meet local, state and federal information requirements.
- . Providing new key systems in areas commonly applicable to all LEAs using the microcomputer and/or facilities at the State Computer Center.
- . Using microcomputers and state data communications facilities with the existing LEA hardware configurations and business systems.
- . Enhancing the existing LEA service payroll system at the DPE potentially so that any small or medium sized LEA may take advantage of this offering.

Appendix E provides a summary of this the hardware and communications strategy.

Organization for Information Processing

Within the ambitious plan to establish integrated systems for education information, it is necessary to define specifically the role of the Controller's Office in information processing at the state level and for the LEA. The proposed strategy provides for the Controller's Office to adopt the following roles:

- An overall advocate and management role for implementation of the various projects in the Plan. This role is one of coordination, supervision, scheduling and communication with the LEAs, state agencies and vendors.
- In an advocate role, the DPE should request necessary personnel and fiscal resources to fulfill existing commitments as well as new commitments for technical support as provided in the Plan.
- The DPE should provide specific staffing for conducting many of the projects in the Plan.
- The DPE should ensure that adequate resources are available for development and ongoing support for each project started. It probably cannot and should not provide staff for all the systems and projects in the Plan. In many cases, obtaining necessary funding and effectively dealing with outside vendors is a more effective use of DPE resources than attempting to provide specific technical skills and staffing.
- The DPE should continue to identify and address potential areas where a system problem is being addressed across many LEAs and where there is potential for a common solution.
- Systems provided by DPE for the LEAs should be operated by the LEAs, not DPE. This approach would apply to centralized and decentralized systems, and would allow more effective use of available DPE staffing.

Inherent in the organization strategies is a change in the methods used by the Controller's Office to achieve the mandated, legislative responsibilities it has been assigned. Currently the Controller's Office relies on significant levels of detailed audit of LEA transactions to ensure that expenditures are as authorized, that salaries paid are correct and that the budget is being well managed (among other responsibilities).

Improved management information from new systems at the DPE level will allow fundamental changes from the approach of performing monthly detailed audits of LEA transactions. The Plan provides for implementation of overall management reporting to verify the reasonableness of salaries, expenditures, monthly cash certification and other key information with reduced reliance on detailed monthly audits of LEA expenditures including general expense and

personnel vouchers. Part of this strategy involves additional reliance on the single audit program to perform these same functions on a less frequent basis with less effort both at the LEA and state levels. This approach will allow additional management attention to addressing specific areas of fiscal, personnel, and program management as opposed to focusing on detailed verification of the LEA transactions.

An additional key aspect of the organization strategy is definition of ongoing roles for approval and management of the various projects, in addition to the role to be played by the Controller's Office and DPE. Three levels of management are anticipated as follows:

- The State Board of Education should provide oversight for the conduct, resource utilization and progress of the projects on a periodic basis.
- A continuing Management Advisory Committee (MAC) involving key user personnel should function in an overseer role for all the projects to ensure adequate definition of the scope and policies involved with various projects and to ensure that adequate resources are available for development and ongoing operation of the systems.
- Temporary steering committees should be appointed for the duration of each project to provide specific insight, approval and resource knowledge for the design and installation of the individual projects on a more detailed frequent basis than the Management Advisory Committee.

Security

Security is a key issue and strategy in the overall plan for integrated systems. Three major aspects of security must be addressed.

- The security of LEAs from abuse of the information sharing network by the state through unreasonable requests or unauthorized access of LEA information is a point of concern. Local LEA information within the Plan is not anticipated to be directly accessible by the state but rather that LEAs would provide specific requested information on a periodic schedule or as needed to respond to specific requests for information from outside agencies such as the Legislature.
- Specific information about personnel that is accessible within the network must be provided necessary levels of security to protect individual privacy.
- Student information will not be identifiable to a specific student outside of a school. Any identifying information for a student would be omitted from data that is to be sent to the DPE.

SUMMARY OF IDENTIFIED PROJECTS

This section describes the nature of the effort in the information plan to address specific problems within major functional areas. The effort will require five years to complete. The plan is comprised of a number of major projects. They are described below with respect to the problems and major functional areas they address. They are described in further detail in the "Overview of Projects" in Appendix C. They are also grouped with respect to major initiatives and expected benefits over time in Appendix B.

Personnel and Fiscal Management

One of the most visible problems related to management of the public school fund is the lack of current fiscal information to allow:

- Accurate knowledge of current and projected end of year positions against fund allotment.
- Accurate knowledge of month-to-month salary requirements to support cash advances to the LEAs.
- Specific knowledge of expenditure areas to allow management action for controlling cost and timely response to critical needs.

Symptoms of ineffective funds management include:

- Excessive monthly cash certifications to some LEAs.
- Overdraws of certified amounts by other LEAs.
- Inability to take appropriate timely action as evidenced in the budget crisis of last year.

A related problem is the very untimely teacher and salary certification process within DPI and the Controller's Office. Currently the two-to-three month lag in certifying correct salaries causes under and overpayment situations with the teachers and a significant personnel problem for the LEAs in dealing with these situations.

Projects to address these problems are related in that 90% of the monthly costs of education from state and federal funds are for personnel. For this reason a series of projects to improve the timeliness and accuracy of personnel and payroll information at the state level has been identified. These projects are necessary prerequisites to any effort for controlling fiscal activity and include:

- DPE Administrative Systems Upgrade - An initiative to eliminate backlogs and to remain current in certifying teachers and certifying the correct salary, ideally before an individual is paid the first time. DPE would promptly notify the LEA of the result of the salary and professional certification process.
- Position Control System - An improved system for maintaining teacher certification and professional personnel positions in

order to make useable the current teacher and other position information for purposes of cash certification and budget forecasting.

- Cash Certification and Payroll Reporting - A cash certification process projecting personnel costs and general expense information and providing reconciliation reporting for the LEAs so that actual monthly payroll expenditures can be tied to the initial certified cash amount. This process would improve timeliness, provide accurate fund allotment reporting, eliminate the number of adjustments and reduce the necessary amount of auditing detailed personnel vouchers.
- Timely Accounting and Financial Reporting Project - Improved processing methods and monitoring of the monthly financial reporting from the LEAs. This project would improve accuracy and expedite reporting of financial data. A specific objective is an ability to report this data prior to the detailed audit which is currently required within the Controller's Office. Improved accuracy of this reporting and improved management controls over the process will allow a reduction of these detailed audit procedures. Also, additional use of the single audit procedure at the LEA should improve the quality of the overall audit of LEA activities with reduced effort from the Controller's Office.
- Transportation Information System - A specific system to address transportation costs. This is a major area of costs from the Controller's Office viewpoint. The system would provide improved preventive maintenance scheduling and performance; monitor key statistics about gasoline consumption, miles driven, and driver information; and would provide inventory control capabilities for the local garages. The system would be implemented for the garages by using available facilities from the existing Department of Transportation system, and by supplementing that system with necessary additional features such as bus route scheduling support.

The Transportation Information System is represented in Appendix B as one of the initial critical projects for binding commitment. The other systems and projects referred to in this area are initial, critical projects for fiscal, legal requirements.

Financial and Education Program Reporting

Adequate information by program or by student numbers, particularly for exceptional children programs, is not currently available. There are four separate requirements for improving this information:

- More timely, accurate financial data, which should be provided by the above projects.
- Teacher participation statistics by program, or other area of activity. Percentages for such information should be available from the Position Control System described above.

- Student Information Management System - Student participation statistics for full-time students in various programs, and particularly full-time-equivalent statistics for mainstreamed students. The proposed Student Information System would provide this information and a basis for monitoring class size.
- Special Program Cost Accounting System - Improved financial, teacher, and student information would serve as an input to a program accounting system as required by the Legislature. The Special Program Cost Accounting system is represented in Appendix B as an initial, critical project for binding commitments.

In the short run, education program cost accounting will be accomplished through allocation techniques providing reasonable information about per program and per pupil costs. Over the longer term, the plan incorporates a more comprehensive revision of all the financial systems with a major benefit being more accurate cost information as the sophistication of management techniques and reporting needs evolves.

Access and analysis of the improved financial and program information would be provided by an Information Center in the Controller's Office. This advanced function would incorporate procedures and technical tools for the purpose of responding to inquiries (Legislative, DPI, OBM, etc.) and preparing reports and projections of key costs and other critical statistical information.

School and LEA Administrative and Business Systems

A series of projects is included in the plan to provide LEA support tools for their fiscal, personnel and program management responsibilities. These projects include:

- Budgeting Support Features - Budgetary support to better integrate the budgeting process at the local level with related efforts being performed at the state level. The support would include very straightforward budgeting software to be available to DPE and the LEAs.
- Payroll and Personnel Support for LEAs - Specific assistance for payroll and personnel processing for those LEAs which desire support in this area. These projects include the availability of DPE software for payroll and personnel processing and central listings of available applicants and open teacher positions.
- LEA Administrative Support - Projects to provide specific system support and technical guidance for the data processing needs of the LEAs. These efforts would include ongoing consultative and technical guidance and one-time projects to address existing commitments for data processing support such as the LEA computer project with the Burroughs Corporation previously described in this report.

- . Nutrition Management System - Specific systems support for the food service area including control of inventories, analysis of costs relative to meal planning and meal portions and assistance in reporting participation in free and reduced meal programs.

These projects, and others such as the Student Information Management System, have the specific purpose of reducing the administrative workload of teachers, principals and others. Automated assistance will be provided in conducting clerical tasks such as posting attendance, as well as in preparing necessary reports for DPE requirements. These projects are represented in Appendix B as additional LEA support projects and projects for major upgrade of financial and personnel systems.

Organization and Technical Prerequisites

In order to help ensure adequate staffing, management control, coordination and consistency across the projects, a major organizational and technical prerequisites effort must be conducted. This effort is necessary because of the magnitude of development effort and significant technological enhancement to be undertaken.

The integrated systems are based on a technical architecture which would incorporate the use of data communications to reduce the flow of paper between DPE and the LEAs and would significantly improve the accuracy and timeliness of critical information. The use of microcomputers at the LEA and school levels is proposed as a cost effective, commonly applicable tool which can be integrated with existing LEA mainframe computers. The plan provides for a microcomputer to be located at each LEA and garage for participation in an information sharing network with the Department of Public Education. The information network is a key feature of the plan. It is a major step forward in applying technology for business purposes, and it integrates DPE and the LEAs for purposes of sharing information. This significant aspect of the plan will yield benefits over a period of many years.

These prerequisites will be accomplished through a series of technical projects and establishment of a common data transfer system. The technical projects are part of the initial critical projects for fiscal, legal requirements in Appendix B. The common data transfer system is represented in the category of SIMS and required technical support in Appendix B.

IMPLEMENTATION APPROACH AND PROJECTED COSTS

The variety, number, and magnitude of management problems being addressed, and the degree of effort required to improve the quality of DPE systems dictate that the effort to develop new integrated systems be a very large effort, consisting of a series of projects conducted over approximately five years. This section of the report describes the major considerations affecting the schedule and approach for conducting the projects; it also presents the overall approximations of effort and cost.

Project Schedule

Each system described in the report is a highly desirable system that could provide immediate significant benefits for cost savings, better resource allocation, or improved management information. However, the magnitude of the development effort, the series of necessary prerequisite activities, and the need to be sensitive to the ability of the DPE and the LEAs to absorb new systems precludes undertaking more than four to five projects at one time. The schedule of projects and anticipated benefits is in Appendix B. The following points influenced the relative scheduling and specific timing of projects:

- The need to address the project objectives relative to the Controller's Office legal responsibilities is a major, initial area of effort. In addition, demonstrating early effort and results at DPE is important for gaining confidence and credibility with other system users. During the project, the need for this effort was described by some users as "getting the DPE house in order first."
- There are several activities which are prerequisite for achieving results in other areas.
 - The technical and organization prerequisite activities must complete several critical tasks before significant project implementation effort can proceed. Examples include selecting and acquiring microcomputers and data communications network implementation.
 - The series of three projects - DPE Administrative Upgrade, Position Control System, and Cash Certification System are a logical group of projects, each preceding the other for implementation. However, they must be started early and must be overlapped during development in order to achieve desired results during the 1985-86 school year.
 - Special Program Cost Accounting is dependent on several projects to improve financial and personnel information--on SIMS for student program data and on the Information Center for key analytical and reporting tools.
- In general, an attempt has been made to schedule projects to achieve early results, including during the 1984-85 school year.

Development Approach

The approach for developing and introducing new systems in the current information processing environment is sensitive to the following considerations:

- . A key recommendation for the project is to adopt a development methodology to assure high quality, consistent results and to provide necessary tools for managing such a large effort. The methodology should provide key management checkpoints for Controller, steering committee(s), and/or Management Advisory Committee review based on improved knowledge of project scope, cost, resource requirements, etc. at the time of the checkpoint. These overall management checkpoints should include (at least):
 - . Project Startup
 - . Completion of Design
 - . Followup Review at Project Completion
- . The development effort for each project will include system startup at several LEAs that are prepared to acquire the system. Several LEA startups will ensure the workability of the system and will achieve initial results. After the first LEAs are started, the system would be turned over to ongoing training and conversion teams to start additional LEAs as they are ready to acquire the system. This approach is sensitive to the need to be flexible to LEAs for the choice and timing of system startups; it is also most cost effective in early reduction of the level of outside involvement.
- . Each project provides additional design and development time for the following:
 - The LEAs and other users will require an abnormal amount of training support during startup.
 - There are several organizations to be involved with each system. This factor greatly increases the necessary amount of time to develop, review, and modify design decisions by making the necessary communication more involved and time consuming.
 - Several systems, such as Nutrition Management and SIMS, must address school, LEA and state level needs. Addressing different requirements at various levels adds significantly to system complexity.
- . Where possible, the systems will be developed using available software packages. There are several areas, including attendance, inventory control, transportation management, and personnel where use of packages is likely. However, some additional custom effort will result for each package from the

need to address specific functional requirements of the DPE and the LEAs and technical requirements of the information network.

- Several of the systems will be wholly or partially resident at the State Computer Center (SCC). The approach for SCC-resident systems assumes the use of SCC's mainframe computers and software productivity aids for development and ongoing operation of those systems.

Effort and Costs

As with any major project of the scope and magnitude of this Information Plan, it is not practical or desirable to provide effort or cost approximations sufficiently accurate to conduct in full any one project. The approximations provide an overall order of magnitude measure of the effort and cost, to be used for managing and controlling the scope of the overall effort. The key management checkpoints described earlier provide the necessary basis for control at the times when sufficient detail of scope and cost are available.

The approach for approximating effort and costs has been summarized in Appendix D. The estimates of effort recognize the significant scope, complexity, and need for support involved with each project. The costs provide for the full cost of designing and implementing each system within the defined estimating parameters. These full costs include:

- Personnel, including fully-loaded costs for state personnel, and consultants
- Hardware to be acquired
- Data Communications
- Acquisition of necessary software
- Use of SCC computers for development
- Out-of-pocket travel expenses
- Use of facilities and clerical personnel
- Other miscellaneous items

The approximate cost in 1984 dollars for new funds (expansion budget) required to developing the integrated systems is \$16.3 million. This cost would be incurred over five years. The major cost components are internal and outside personnel costs, including travel and associated expenses.

Assuming an annual inflation rate of 10%, the total project cost would approximate \$20 million following the implementation schedules shown in Appendix B. The potential future cost of \$20 million is approximately \$4 per ADM per year for the five-year effort, or about 1/4 of 1% of the projected DPE budget for the same period.

The projects to implement the integrated systems for education information will cover about five years. The projected costs for the series of large projects are shown below. A more detailed breakdown of project costs by year is shown in Appendix B-1.

PROJECTED EXPANSION BUDGET COSTS
FOR INTEGRATED SYSTEMS

(000's of '84 Dollars)

<u>Fiscal Year</u>	<u>Total New Costs</u>	<u>One-Time Development Costs</u>	<u>New, Ongoing Costs</u>
'83 - 84	\$ 300	\$ 300	\$ -
'84 - 85	5,100	4,900	200
'85 - 86	5,000	4,200	800
'86 - 87	3,600	2,400	1,200
'87 - 88	4,000	2,600	1,400
'88 - 89	3,300	1,900	1,400
'89 - 90	<u>1,500</u>	<u>-</u>	<u>1,500</u>
TOTAL	\$22,800 =====	\$16,300 =====	\$6,500 =====

PREREQUISITES FOR SUCCESS

There are several prerequisites for successful implementation of the proposed Plan. The most critical are summarized below:

- . Goals of the Plan will best succeed based on an approach of support and positive incentives, including fiscal incentives rather than edict or mandate. The DPE should assist the LEAs in dealing with their management problems at the same time that the information needs of the DPE are being met. A spirit of cooperation and a sense of addressing common problems will be essential for the success of the projects and the overall Plan.
- . The Information Plan must be used and modified on an ongoing basis to be effective. It should be dynamic in the following ways:
 - Timeframes, scope, and relation of projects should be modified to adapt to current needs and to reflect the actual course of events.
 - An annual update of overall priorities, needs, scope, and schedule should be performed.
 - Progress reporting to the MAC and the State Board of Education should use the updated plan as a basis of comparison.
 - Flexibility should be maintained to add additional projects or modify project scopes within the framework of the Plan as additional requirements are identified.
- . A high level of communication and input from a variety of perspectives will be essential to guide the project efforts. This contribution can best be made by a group similar in form and function to the Management Advisory Committee which guided the development of the Plan. The ongoing committee would assist in performing the following critical functions:
 - Overall direction and priority setting for the Plan as it is implemented and evolves.
 - Recommendation for starting the design phase of each project. The recommendation should be based on ensuring the following:
 - . Adequate resources for project implementation and ongoing systems support, including the ability of the LEAs to work with the new system (if appropriate).
 - . Adequate funding for other project resources, including computer resources.
 - . Appropriate confirmation of the scope of the project.

- Specific approval of the results of the design phase including resolution of the following:
 - . Policy issues relevant to the project.
 - . Key functional and technical design issues.
 - . Reaffirmation of adequate resource requirements to implement and support the system.
- . Independent project steering committees should be established for each design and installation phase within each overall project. The steering committees would be more accessible than the MAC and would provide more frequent, in-depth input to the substance of the project. The steering committees would not have a management responsibility but would have responsibility for ensuring that the content, scope and policy resolutions within each project are correct and consistent with the directions of the MAC. These groups would be temporary rather than permanent groups; their specific assignment would begin and end with the duration of the project. The project steering committee should receive or should resolve, prior to beginning each project, an adequate statement of scope, funding availability, and specific placement of responsibility for the progress of the project.
- . Adequate funding to ensure the success and ongoing support of each project or initiative will be essential. This includes not only the funding for systems developed in Raleigh, but also for those systems impacting the LEAs. LEA support will be better ensured by provision of funds for state-dictated needs.
- . The success of the Plan will continue to hinge on the ongoing support--other than financial--from the Board, the Controller's Office and the LEAs. Partial implementation of a few of the projects will not achieve the project objectives. It must be recognized that a strong initiative and sense of momentum about the project must be maintained despite the difficulty in a project of such duration.
- . Aside from the overseer responsibility of the Board and the MAC, there will need to continue to be a strong role of overall project direction and management through the Controller's Office. With a number of different initiatives in process, it will be necessary to ensure that the effort and results are well integrated. The approach for conducting the process should make sense when viewed across projects and should be reasonably consistent. The relative time frame of the project completions should be monitored to ensure that the prerequisite elements are in place at the necessary times.

- . A significantly greater-than-normal effort for training and initiating LEA locations will have to be conducted. This effort will be true for the initial implementation of communications capabilities from the LEA to DPE and as each system is implemented at each LEA. To the extent that LEAs must perform additional tasks of converting data, it may be expedient for the state to support that LEA further in terms of manpower, technical guidance and perhaps funding.
- . An adequate, reliable source of staffing for development and ongoing support, operations and maintenance for each system must be assured prior to the start of each project. While this staffing may not necessarily be from within DPE or state government, the specific source of staffing should be known or a specific plan for obtaining that staffing must be in place for each project.
- . The project must demonstrate initial, timely results to gain additional LEA confidence and to establish the momentum of the project. For this reason, delays in starting the project will be costly, not only in time loss, but also in the loss of the current enthusiasm and momentum associated with the results of the planning project. Specific near-term results may be as simple as initial implementation of the communications network and the simple inquiry capability for teacher certification. Whatever those results may be, they need to be substantive, error free and must be given adequate visibility to recognize the achievements that are made.

CONCLUSION

The project to develop this plan of action has achieved significant results for the Department of Public Education, the LEAS, and associated agencies. These results include:

- . Proposed strategies for conducting the business of education in the State of North Carolina.
- . A plan for achieving the objectives and meeting the needs of all key groups without undue cost or disruption on any single group.
- . An improved level of communication and cooperation between the Controller's Office and LEA managements. The void in mutual confidence and trust has begun to be filled by the policy decisions, actions, and results achieved. As a result, the proposed plan has been received with enthusiasm, interest, and an expressed desire to participate by a significant number of LEA superintendents and finance officers.
- . Start of short-term projects and improvements identified during the project, including the initial prototype telecommunications link between DPE and an LEA, and effort to process additional LEAs on the DPE payroll system.

In order to capitalize on the success and initial results of the proposed plan, it will be necessary to move rapidly to the individual project design efforts so that continued progress can be shown. In addition, key participants in managing the effort must give attention to the prerequisites for success itemized in this report. Finally, specific action items should be quickly addressed:

- . The project should be publicized at the state and local level, to continue to raise the knowledge and understanding of key groups.
- . Obtaining necessary funding for implementing the projects will be critical.
- . Specific, near-term action should be taken to mobilize appropriate users to form an ongoing Management Advisory Committee and project steering committees for initial projects, to facilitate project startup and to sustain the current momentum, enthusiasm and confidence achieved thus far.

Significant among the results of the project is the clear potential to improve the effectiveness and equity of allocating the hundreds of millions of dollars spent each year for public education in North Carolina. The ultimate recipients of improved business management of these funds clearly are the public and especially the students in the state public school system.

INDEX FOR APPENDICES

- A. Members of the Management Advisory Committee
- B. Schedules for Project Costs and Effort
- C. Project Descriptions
- D. Summary of Approach for Approximating Effort and Costs
- E. Hardware and Communications Strategy

INFORMATION PLANNING PROJECT
MANAGEMENT ADVISORY COMMITTEE

<u>NAME</u>	<u>REPRESENTING</u>
Jim Barber (Chairman)	Controller's Office of DPE
Bradley Buie	State Auditor
J. D. Foust	State Treasurer
J. D. Corbett	LEA Computer Project
Laeron Roberts	Department of Administration
Charlie Williams	
Allen Barwick	Office of State Budget
Sue Adams	and Management
William Peek	DPI of DPE
John Dunn	Superintendent of Edenton-Chowan LEA
Jim Ellerbe	Superintendent of Johnston County LEA
John A. (Gus) Campbell	Finance Officer of Charlotte- Mecklenburg LEA
Roger Jackson	Superintendent of Ashe County LEA
Frank Yeager	Superintendent of Durham County LEA
Bill Hair	Superintendent of Bladen County LEA
Ray Sarbaugh	North Carolina Association of School Administrators
Bill Troutman	Executive Committee, N. C. Association of School Business Officials

SCHEDULES OF PROJECT COSTS AND EFFORT

This Appendix presents schedules of the expansion costs of major groupings of projects over time and the projected schedules of project development. The projected expansion budget schedule presents both one-time development and continuing costs for new systems over time for the major groupings of projects. The projects which comprise each group are presented in the schedules on pages B-iv through B-viii along with their anticipated schedules for implementation. The time frames for realizing specific features/benefits are also included on these pages. Page B-iii presents a summary of the major category schedules and major benefits to be realized.

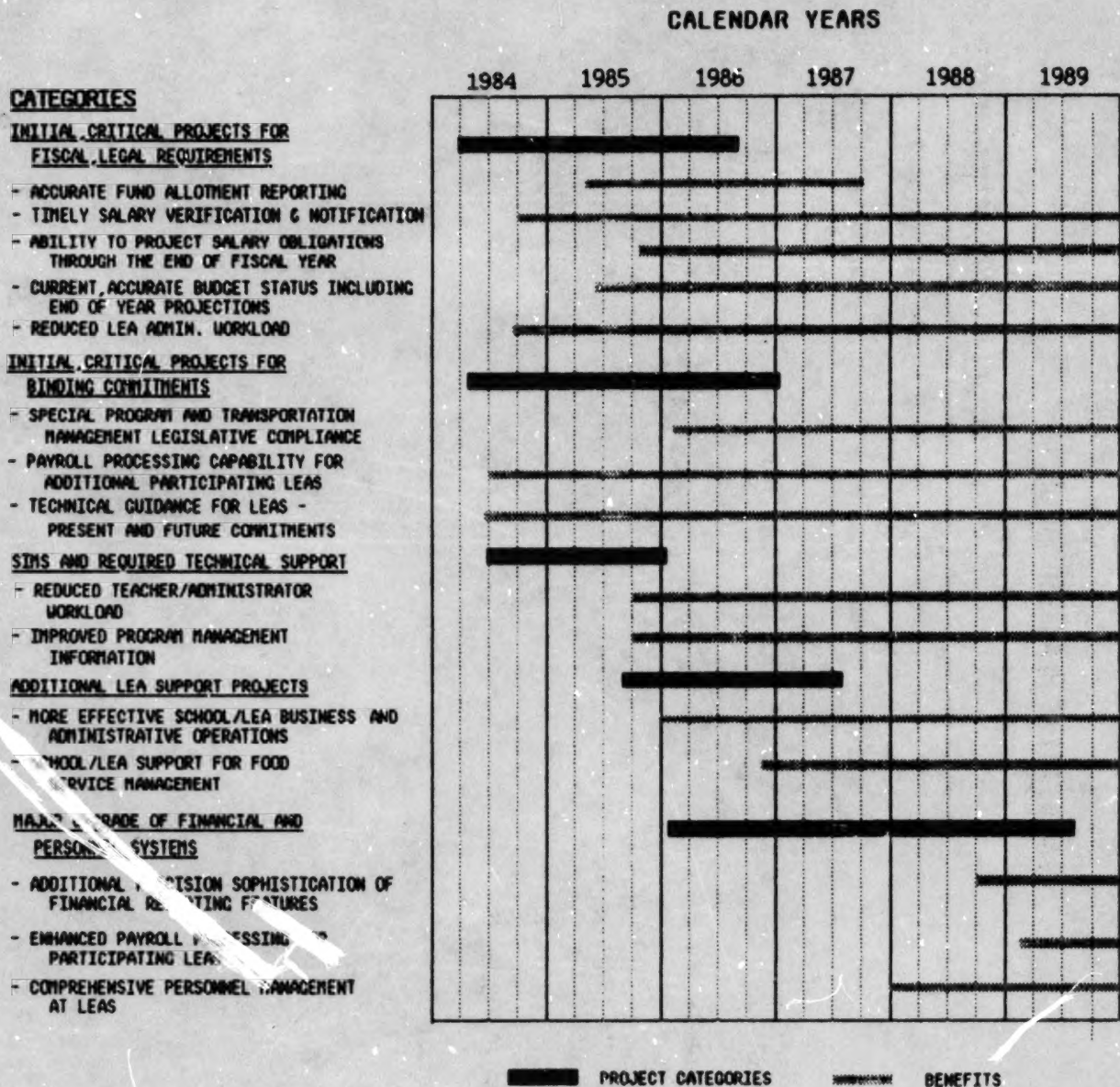
INFORMATION PLANNING PROJECT

PROJECTED EXPANSION BUDGET COSTS

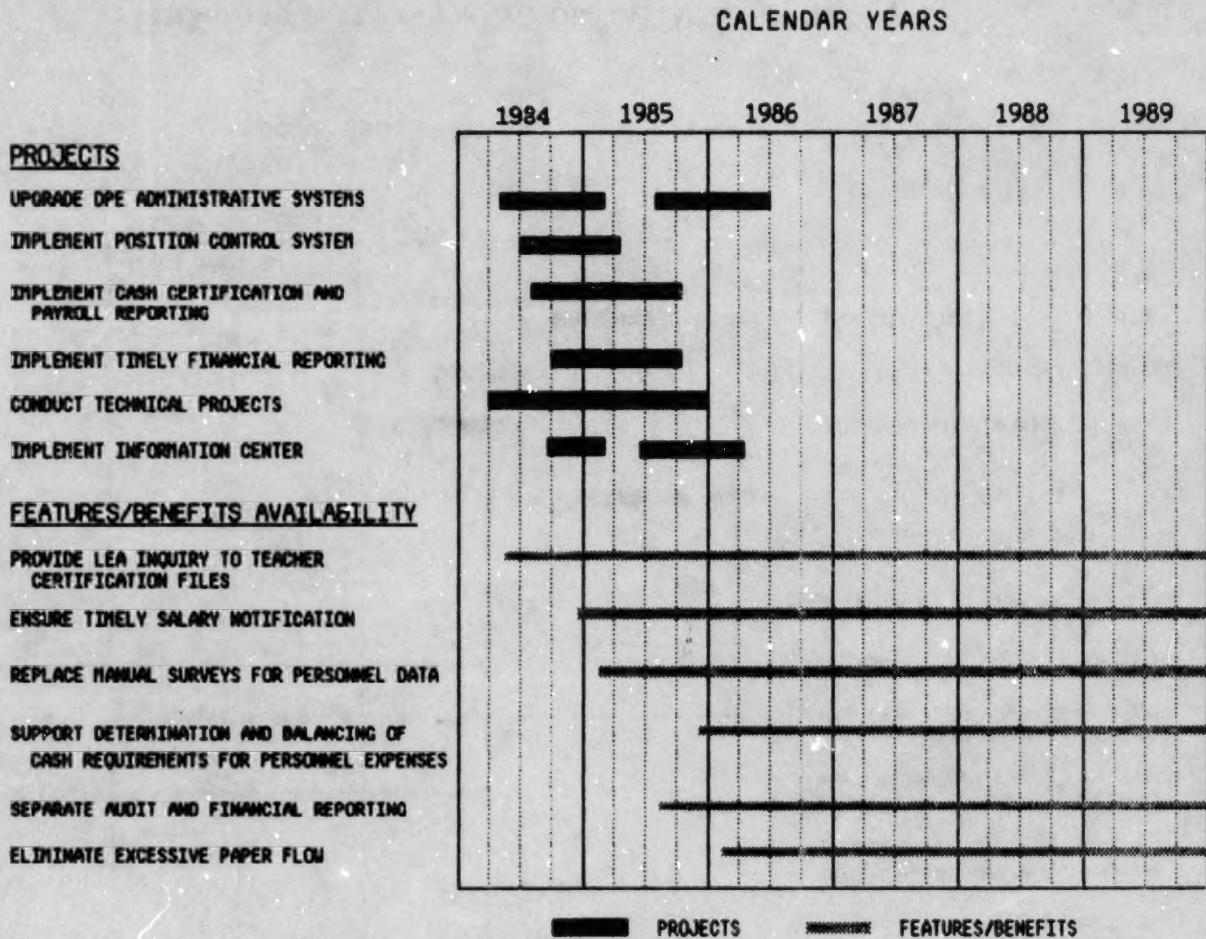
ONE TIME DEVELOPMENT COSTS	FISCAL YEAR (000'S '84 DOLLARS)						89-90 AND BEYOND
	83-84	84-85	85-86	86-87	87-88	88-89	
● INITIAL CRITICAL PROJECTS FOR FISCAL, LEGAL REQUIREMENTS	\$ 300	\$3,100	\$1,900				
● INITIAL CRITICAL PROJECTS FOR BINDING COMMITMENTS		900	900	\$ 900			
● STUDENT INFORMATION MANAGEMENT SYSTEM AND REQUIRED TECHNICAL SUPPORT		900	800				
● ADDITIONAL LEA SUPPORT PROJECTS			500	500			
● MAJOR UPGRADE OF FINANCIAL AND PERSONNEL SYSTEMS				1,000	\$2,600	\$1,900	
TOTAL DEVELOPMENT COSTS	\$ 300	\$4,900	\$4,200	\$2,400	\$2,600	\$1,900	-
CONTINUING COSTS FOR NEW SYSTEMS	-	200	800	1,200	1,400	1,400	\$1,500
TOTAL NEW COSTS	\$ 300	\$5,100	\$5,000	\$3,600	\$4,000	\$3,300	\$1,500

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PROJECT CATEGORIES AND ASSOCIATED BENEFITS

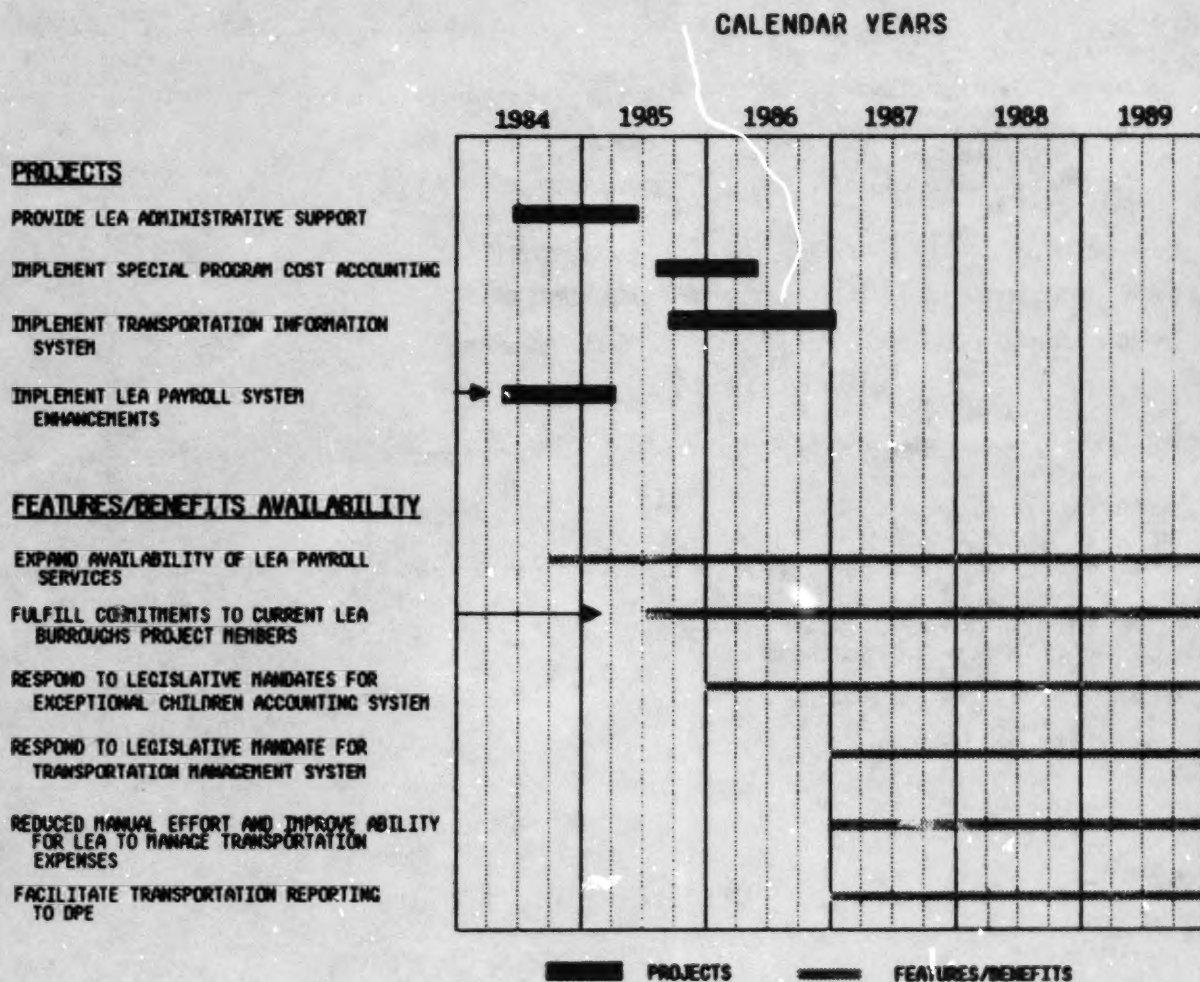


INITIAL CRITICAL PROJECTS FOR FISCAL, LEGAL REQUIREMENTS



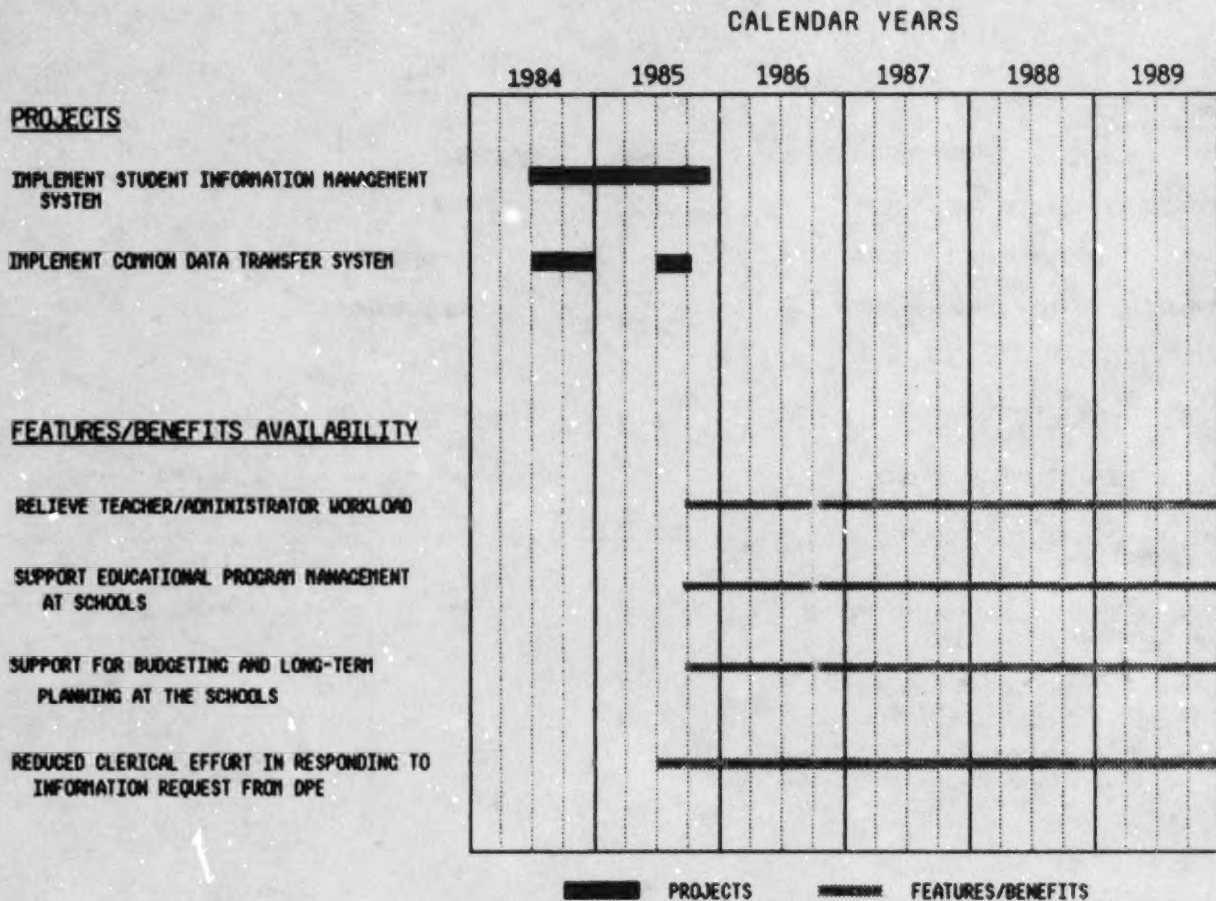
NOTE: —————> SIGNIFIES EXISTING EFFORT WITHIN THE CONTROLLER'S OFFICE

INITIAL, CRITICAL PROJECTS FOR BINDING COMMITMENTS



NOTE: → SIGNIFIES EXISTING EFFORT WITHIN THE CONTROLLER'S OFFICE

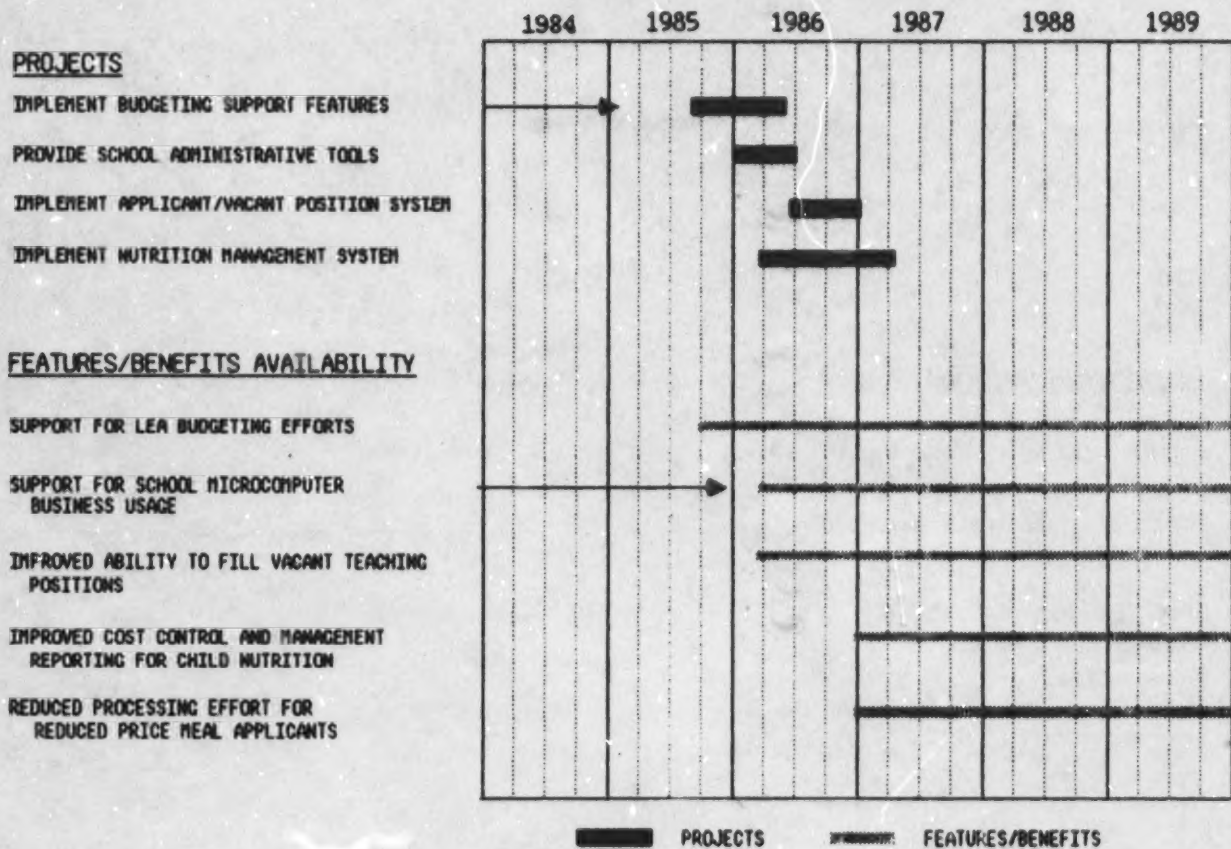
STUDENT INFORMATION MANAGEMENT SYSTEM
AND REQUIRED TECHNICAL SUPPORT



NOTE: → SIGNIFIES EXISTING EFFORT WITHIN THE CONTROLLER'S OFFICE

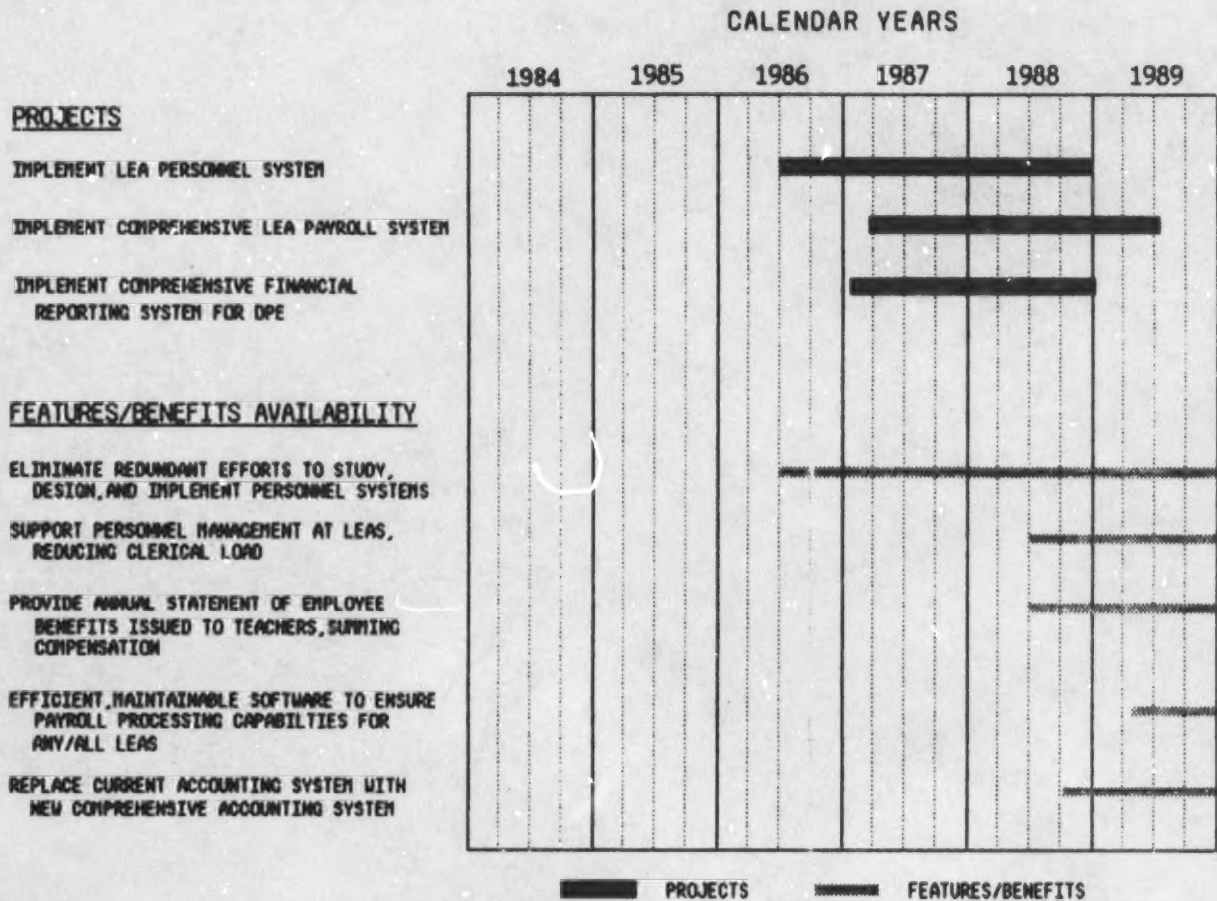
ADDITIONAL LEA SUPPORT PROJECTS

CALENDAR YEARS



NOTE: → SIGNIFIES EXISTING EFFORT WITHIN THE CONTROLLER'S OFFICE

MAJOR UPGRADE OF FINANCIAL
AND PERSONNEL SYSTEMS



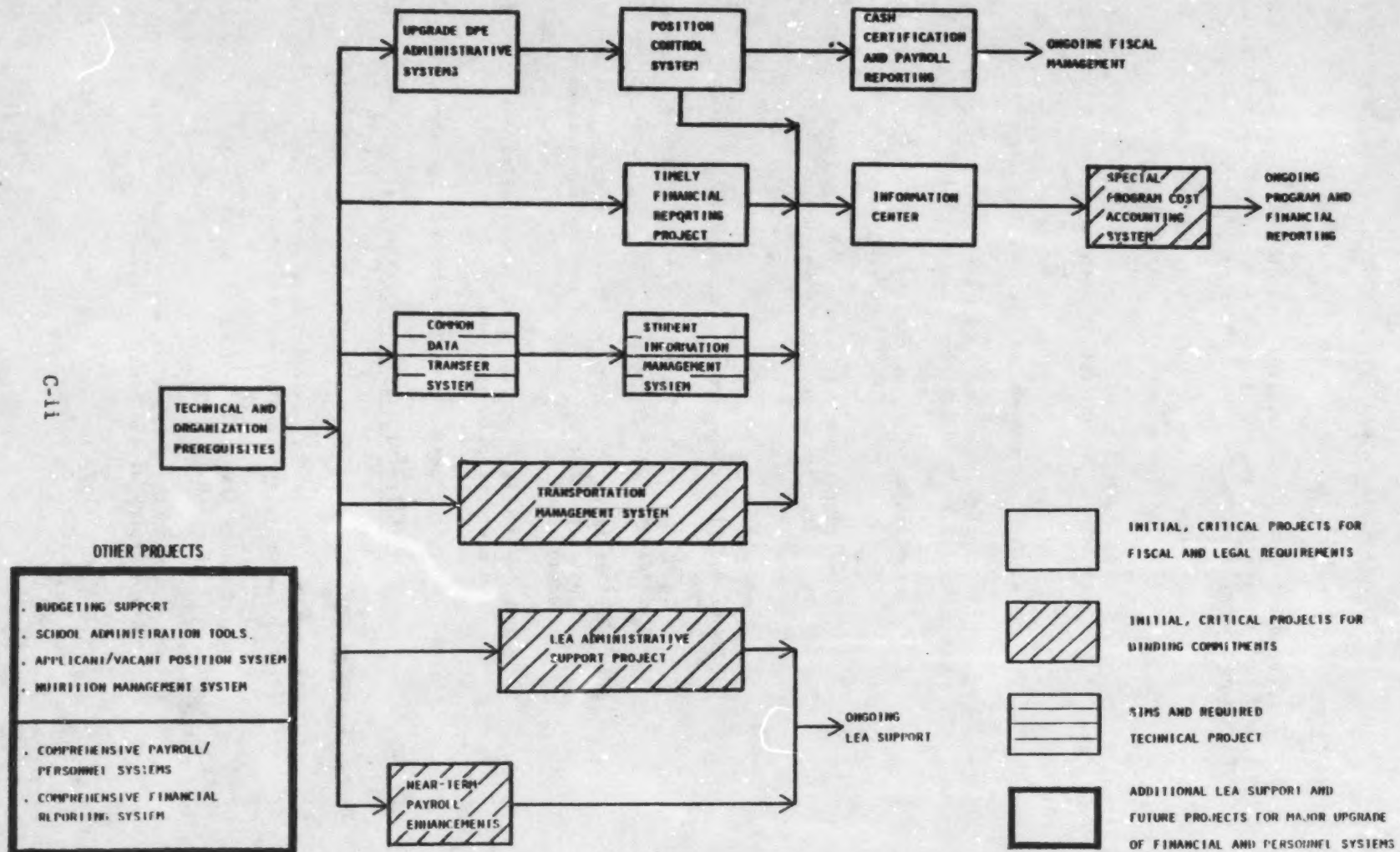
NOTE: —▶ SIGNIFIES EXISTING EFFORT WITHIN THE CONTROLLER'S OFFICE

OVERVIEW OF PROJECTS

This appendix presents a summary description of each of the eighteen projects identified within the Plan. An overview of the objective, scope and benefits is provided on each project, with additional information available in the detailed report.

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INTEGRATED SYSTEMS FOR EDUCATION INFORMATION PROJECT RELATIONSHIPS



TECHNICAL AND ORGANIZATION PREREQUISITES PROJECT

Objectives

The objectives of conducting a group of technical and organization projects focus on providing support for the development and ongoing maintenance of the systems identified in the Plan. These projects will include:

- Selecting and acquiring initial microcomputers to be used at the schools, LEAs and DPE.
- Selecting and acquiring systems software to be used in development of systems on both mainframe and microcomputers.
- Organizing the MIS division under a structure which can support both systems development and ongoing maintenance.
- Providing the needed organization to develop and support ongoing MAC and user groups.
- Establishing a communications network which will allow LEAs to communicate with the DPE and schools.
- Developing technical standards and project control methodology to be used in new systems development.

Benefits

The major benefits these projects will provide include:

- Technical prerequisites to proceed with applications development projects.
- Elimination of redundant efforts which may arise if standard approaches for development and project management are not established.
- Reduced possibility of misdirected efforts by providing MAC and user group involvement.
- Ensured hardware compatibility for all users.

DPE ADMINISTRATIVE SYSTEMS UPGRADE

Objective and Scope

This project consists of two phases with emphasis on state-level systems. The objectives of the first phase will be to:

- Expedite the certification of teachers and the determination of salaries.
- Provide timely reporting of problem areas in information processing at the state-level.
- Allow on-line inquiry from the LEAs to the state-level teacher certification file.

The second phase of the project is less time-critical, and will therefore be completed at a later date. The objectives of the second phase will be to:

- Address processing delays at DPE in LEA reimbursement of vocational education and child nutrition funds.
- Enhance current basic administrative systems and procedures of the DPE, potentially including:
 - . Purchasing and Supplies
 - . Textbooks
 - . Personnel Management
 - . Exceptional Children Reporting
 - . Reporting to the Energy Department

Benefits

- Reduced backlog in teacher and salary certification requests thereby substantially reducing the number of incorrect salaries paid.
- More reliable immediate access to key teacher certification information for use in hiring and other decisions.

POSITION CONTROL SYSTEM

Objectives and Scope

The Position Control System addresses the need to provide timely, useable certification and cost-related information for personnel. While the majority of the required information is currently available at the State level, it is out-of-date, inconsistent, and not in a workable form for projections and other uses. The system will provide the technical environment necessary to allow selective inquiry and maintenance of data from the state and local levels. From this data, tests of reasonableness for funds certification and accurate budget forecasts may be performed.

Benefits

Benefits from the system include more accurate and accessible information on federal, state, and potentially, on local personnel. This information can then be used for cash certification review, budgetary status review, program costing and other purposes.

CASH CERTIFICATION AND PAYROLL REPORTING SYSTEM

Objectives and Scope

The objectives of the Cash Certification and Payroll Reporting System are to:

- Provide more precise fund allotments.
- Provide accurate fund allotment reporting.

- Reduce the level of auditing necessary for payroll expenses.
- Provide a simple, monthly reconciliation technique which ties LEA cash certified to cash spent.
- Provide accurate monthly forecasts of cash requirements.

Benefits

While the primary purpose of the system is to provide better fiscal management of state funds, LEAs will benefit in that:

- Forty percent of the personnel worksheets will be eliminated.
- More information on current balances of expenses and unallocated months of employment will be available.
- The need to send and audit detailed personnel expense vouchers every month for every LEA will be eliminated.

TIMELY ACCOUNTING AND FINANCIAL REPORTING FEATURES

Objectives and Scope

This project includes the design and implementation of features to improve the timeliness and accuracy of financial information for the LEAs, DPE and other State agencies.

To achieve this objective, features of this project include:

- Improved data entry and edit capabilities for monthly financial information of the LEAs.
- Automated transfer of monthly financial data to DPE.
- Reduced reliance by DPE on detailed transaction information from the LEAs for financial reporting and reduced detailed audit requirements of DPE prior to preparing monthly consolidated LEA financial statements.
- Improved standardization for funds transfer/administration for all programs.
- Improved reporting from DPE's Financial Management System which is the interface to the states Departmental Accounting System.

Benefits

Benefits to be gained from this project will be realized at both the local and state levels. LEAs will benefit from reduction in the volume of data

and improved techniques for sending financial reporting data to the DPE, and reduced turnaround time on receiving financial information back from Raleigh. The DPE will benefit from the ability to prepare financial statements in a timely, accurate manner and from a reduction in the amount of transaction auditing required to prepare accurate consolidated LEA financial statements each month.

INFORMATION CENTER

Objectives and Scope

The objective of establishing an Information Center is to provide a centralized information management function at the DPE to respond to internal and external information requests. The project will identify the needed reporting mechanisms to answer requests and provide the tools for decision support, forecasting, and analyses. Among those tools may be existing or new data bases, software, and Information Center operating procedures.

Benefits

The major benefits which an Information Center project will provide are:

- Reduced data redundancy at DPE level
- More consistent solutions to information requests (internal and external)
- Clarified data definition at DPE level
- Better LEA and other user access to DPE information
- Improved ability to answer information requests
- Reduced level of information requests to LEAs

TRANSPORTATION INFORMATION SYSTEM

Objectives and Scope

The objective of the project to implement a Transportation Information System is to provide the LEAs with improved tools for managing transportation resources and reporting key operational and financial data to DPE. Management information now required at the local level includes:

- Inventory control
- Preventive maintenance scheduling and performance
- Bus routing and scheduling
- Daily operations monitoring

The scope of this project will include use of all appropriate, available features of the existing Department of Transportation system,

supplemented with any necessary additional features such as bus routing and scheduling. The project anticipates an extensive effort for data conversion, training and other tasks at a number of initial participating garages.

Benefits

Benefits of implementing a Transportation Information System will include:

- Improved management of transportation resources locally.
- Reduced manual effort required for maintaining detailed transportation records locally.
- Better management of transportation costs and more effective allocation of transportation resources, provided by an improved ability to focus on specific problem areas.

SPECIAL PROGRAM COST ACCOUNTING FEATURES

Objective and Scope

The objectives of the project to implement Special Program Costs Accounting Features are to provide:

- An improved mechanism for reporting educational costs by program and per pupil.
- A basis for responding to legislative and other inquiries.

The scope of this project will be to define and implement a program accounting mechanism utilizing existing financial accounting systems and allocation information from new systems such as:

- Headcount by special program or area of exceptionality (from implementing Student Information Management System project).
- Accumulation of information about teacher time spent by program through accurate position control information (from implementing Position Control System project).

This project will receive allocation models and formulas to determine costs by program from the existing accounting data and the new student data.

Benefits

The benefits produced by this project will include reduced clerical effort and improved precision and extent of coverage in cost accumulation by program. These improvements will benefit both LEAs and the DPE in monitoring educational program resources and meeting special program reporting requirements.

LEA ADMINISTRATIVE AND BUSINESS SYSTEMS SUPPORT

Objectives and Scope

The project to provide LEA administrative and business systems support will address both current DPE commitments and future application. The two major objectives of this project will be to:

- Define and implement ongoing support activities for the LEA Burroughs Computer Project, including the roles of the DPE, outside vendors and N. C. State University.
- Provide implementation support for LEA applications not addressed in other projects. This effort will include participation in the initial LEA installations to ensure workability, with ongoing consultative assistance provided by DPE staff.

Benefit

The LEA will benefit from this project by having a more clearly defined direction for the LEA Computer Project and receiving guidance and support for the implementation of new applications. Efficient, automated systems at the LEAs will improve local administrative and management functions and will enhance the quality of information provided to DPE.

LEA PAYROLL SUPPORT SYSTEM

Objectives and Scope

This project will implement a voluntary, centrally-located payroll system to be processed and administered locally. The project will be completed in two phases.

The objectives of the first, near-term phase are to:

- Enhance the current system to accomodate more LEAs.
- Design the technical features and procedures necessary to convert control of the processing to SCC and the LEAs.

The second phase, to be conducted late in the planning horizon, anticipates the potential replacement of the current software by modified package software. This effort would be necessary if a large number of LEAs participate and as the existing software becomes technically obsolete.

Benefits

LEAs will be the primary beneficiaries of payroll software. As current payroll software at the LEAs obsolesces and the state demonstrates its ability to provide a reliable system for the LEAs, LEAs should find the DPE to be a viable payroll processing option. The state benefits by savings due to lowered marginal costs in processing payroll and by a greater and more certain responsiveness to change.

STUDENT INFORMATION MANAGEMENT SYSTEM

Objectives and Scope

The project to implement a Student Information Management System will address the need for 1) more timely, accurate and comprehensive student information to support program reporting and to provide key management statistics and 2) assistance for school and LEA administrators for attendance, class size, and other reporting.

The major objectives of the project will be to:

- Define and implement, in a representative sample of initial schools and LEAs, a system which will address the above needs by providing school and LEA level administrative support.
- Provide for the communication of data between schools, LEAs, and the DPE to support management and reporting requirements at each of the organization levels.

Benefits

The project will benefit users at the school, LEA and DPE levels. The following major benefits may be achieved.

- Relieves administrative workloads for teachers and other local personnel.
- Mitigates the need for additional clerical support at the school level.
- Provides educational program monitoring and management information for accomplishing the following objectives:
 - . Monitor student performance by class grades and achievement and competency test scores.
 - . Identify exceptional education situations such as potential failures, dropouts, students in need of additional help, teachers requiring additional guidance and assistance, etc.
 - . Forecast service levels such as projecting the number of exceptional children by type of exceptionality, anticipating the number of teachers to achieve desired class size levels, etc.
- Furnishes long-term planning, annual budgeting and education program auditing data to meet mandated state and federal requirements.
 - . ADM audit and allocation review.
 - . Exceptional children headcount audit.
 - . Class size monitoring and analysis of exceptions.

- . ADM and headcount forecasting which forms the foundation for associated instructional personnel and cost projections.

COMMON DATA TRANSFER SYSTEM

Objective and Scope

The major objective of the project to implement a data transfer system is to provide a transmission mechanism for various LEA systems/data to DPE. The project will design and implement such by providing a simplified user interface to the data communications network. The project will address standard data formats, file management and balancing techniques, and alternate means of data transfer for flexibility and backup purposes.

Benefits

The major benefits to be derived from the project include:

- Increased accuracy and timeliness of data transmitted between LEAs and DPE.
- Reduced LEA effort to transmit data to DPE.
- Closer DPE/LEA ties through data transmission process.
- Minimal redundancy in ongoing information requests.
- DPE ability to monitor information flow between DPE and LEAs.
- Provide file transmission controls for LEA to DPE transmission.

BUDGETING SUPPORT FEATURES

Objectives and Scope

Budgeting support features are enhancements to the current budgeting process. Key objectives of the project are to:

- Standardize key variable calculations (e.g. ADM) to provide more reliable and defensible inputs to the budgeting process.
- Provide more timely state budgetary inputs to the local budgeting process.
- Provide basic microcomputer software to facilitate the budgeting process at DPE and potentially at LEAs.

Benefits

The primary benefit of the project is a state-level budgetary process that provides better budget information for DPE and LEAs and facilitates the budgetary process at the local level.

NUTRITION MANAGEMENT SYSTEM

Objectives and Scope

The project to implement a Nutrition Management System will address school and LEA Child Nutrition operating and reporting requirements. The major objective of the project will be to develop improved manual procedures and provide automated systems support for nutrition management and reporting.

Many schools and LEAs presently have packages which address these requirements. The project should consider the potential use of one of these packages for all schools and LEAs. The major functions considered by the project will include:

- Inventory Tracking and Reporting
- Cost Tracking and Reporting
- Participation/Revenue Tracking and Reporting
- Free and Reduced Price Meal Application Processing

Benefits

The project will benefit schools and LEAs by improving local cost control and management reporting for nutrition operations; improving timeliness and accuracy of reimbursement processing and reporting at the school and LEA; and reducing processing effort at schools for reduced price meal applications.

APPLICANT/VACANT POSITION SYSTEM

Objectives and Scope

The Applicant/Vacant Position System is a state-level service to help LEAs fill key positions with qualified personnel. This system would be administered by DPE and would list available positions for requesting LEAs and teachers by certification type. The system would also list by certification type the individuals who are pursuing positions in the state.

Benefits

The LEAs and the state will benefit from improved ability to match available teachers and vacant positions.

SCHOOL ADMINISTRATIVE TOOLS

Objectives and Scope

The project to provide school administrative tools encompasses the implementation of microcomputer applications at the school level. This project will address school-level needs not met by other projects and will be initiated by surveying existing systems currently in use and identifying areas requiring further direction and guidance. Possible functions to be addressed by this project will include:

- Accounting system for school-controlled funds
- Inventory control for textbooks, media equipment, etc.
- Word processing and other office automation tools.

The scope of this project will include the review and selection of appropriate software packages and installation supplies for the first group of schools involved. Ongoing supplies and assistance will be initiated by this project and will be provided by DPE personnel.

Benefits

Benefits of providing school administrative tools will include:

- Reduced effort required by principals, teachers, and other staff performing administrative duties.
- Improved management tools for cost control at the school level.

COMPREHENSIVE FINANCIAL REPORTING SYSTEMS FOR DPE

Objectives and Scope

A project to implement Comprehensive Financial Reporting Systems for DPE will be conducted near the end of the planning horizon. This project is a major effort to replace DPE and potentially LEA financial systems and will be based on:

- Experience with initial systems enhancements.
- Growing need for more precise, sophisticated financial reporting capabilities such as program cost and participation reporting.

The DPE features to be addressed in this project will depend upon ongoing requirements identified subsequent to the early project, and may include:

- General Ledger System
- Accounts Payable System
- Interface to state's Departmental Accounting System

In addition to implementing DPE changes, this project will also identify the impact of the new systems applications on the LEAs and potentially provide support for modifying their systems.

Benefits

Improved financial systems from this project will benefit DPE by supporting the accumulation and reporting of more precise management

information. Efforts required to administer DPE's fiscal responsibilities will be further reduced through the use of more sophisticated applications.

LEA PERSONNEL SYSTEM

Objectives and Scope

The LEA Personnel System addresses a need of many large LEA's to utilize state of the art computer software to manage professional and other personnel better and with less clerical effort. The objectives of this project are to:

- Provide personnel software to LEAs
- Provide an agreed upon, automated link between the state and LEAs through which some of the manual data collection devices might be eliminated.

Benefits

Among the major benefits of the Personnel System are:

- Improved ability to evaluate and track professional personnel performance. This capability may become increasingly important if merit pay programs are implemented.
- Timely leave tracking.
- Timely career development information to help employees and LEA administrators.
- Better information for monitoring the use of personnel resources.
- Reduced administrative and clerical effort to administer personnel.

SUMMARY OF APPROACH FOR APPROXIMATING EFFORT AND COST

The purpose of preparing approximations of project effort and costs in an information plan project is to provide reasonable order of magnitude numbers for the total costs and resources required by the project as well as to establish an approximate overall timeframe for conducting the projects contained in the plan. The approximations of effort and costs should not be viewed as sufficiently accurate to be a budget to conduct any one of the projects. This is not necessary in a planning project and in fact is not desirable to attempt to pin down to that detail a project which we may be a year or more in the future, since scope or approach may change significantly.

The order of magnitude costs incorporated in the information plan should be used as a management tool for controlling the scope of effort and for evaluating the overall schedule as the project evolves. Part of the recommended approach is an annual update of the plan. Incorporated in this update should be an annual update of the overall project cost approximations for completed work and for remaining work.

More precise estimates of effort and cost for conducting individual projects would be provided at key management checkpoints:

- . A management checkpoint prior to initiating the design phase to review the scope, timing, and development approach for each project.
- . A management checkpoint at the completion of the design to review the more precise and accurate estimate for the remaining installation effort.
- . A followup review at completion of installation to review the results of the project in order to evaluate performance against projections and to provide assistance in planning future projects.

This approach allows the ability to modify scope, timing, or cost at each phase of the project, thereby controlling the total effort and cost involved in the project implementation.

The approximation of effort for each project has been developed based on expert knowledge of similar projects conducted elsewhere, and by definition of the project scope as it is known during the planning project. Established methods for approximating the effort based on the knowledge of the scope and technical features of each system have been used. The cost figures are an approximation or order of magnitude number for the complete development costs for each project. This would include complete personnel costs for both state and outside personnel, the acquisition of hardware and software as defined in the plan, facilities for the personnel, clerical support, use of the State Computer Center where appropriate, communications facility, and other costs. For each cost component an established method for approximating that cost on a per unit basis was used and is documented in the more detailed report delivered for this project.

The projects anticipate an extensive use of outside personnel to avoid excessive hiring requirements for the DPE MIS staff; to provide specific project management and system development skills necessary for this comprehensive, sophisticated project; and to significantly speed up the implementation schedule.

HARDWARE AND COMMUNICATIONS STRATEGY

This appendix outlines the recommended approach for implementing the communications network into an integrated network which consists of schools, garages, LEAs and DPE. This approach identifies the functional and technical requirements of such a network and outlines the present hardware and communications environment by grouping LEAs into one of four categories as shown on page E-iv. Three recommended strategies for integration are presented on pages E-viii and E-ix summarize the strategies as they relate to the various existing environment groups. These pages also summarize the basic replacement and new systems hardware. The objective of the approach is to make use of the existing state network and to minimize required replacement hardware. The contents of this appendix are:

<u>ITEM</u>	<u>PAGE</u>
Functional Requirements	E-ii
Technical Requirements	E-iii
Present Hardware and Communications Environment	E-iv
Strategy A	E-v
Strategy B	E-vi
Strategy C	E-vii
Hardware and Communication Strategy Summary	E-viii

FUNCTIONAL REQUIREMENTS

● LEA

- SUPPORT COMMUNICATIONS BETWEEN LEA AND DPE THROUGH STATE NETWORK
- SUPPORT LEA ON-LINE INQUIRY TO SOME DPE FILES
- SUPPORT PERIODIC DATA TRANSMISSION BETWEEN LEA AND DPE
- SUPPORT LOCAL MICROCOMPUTER PROCESSING PACKAGES DESIGNED BY DPE FOR LEA
- PROVIDE ACCESS TO STATE PROCESSING WITH LOCAL CONTROL AND PRINT CAPABILITIES
- PROVIDE LOCAL AREA NETWORK CONTROL CAPABILITIES (OPTIONAL)
- SUPPORT REQUIREMENTS OF COMMON DATA TRANSFER FUNCTION

● SCHOOL/GARAGE

- SUPPORT COMMUNICATIONS BETWEEN SCHOOL/GARAGE AND LEA THROUGH LOCAL AREA NETWORK (OPTIONAL)
- SUPPORT PERIODIC DATA TRANSMISSION TO LEA
- SUPPORT MICROCOMPUTER PROCESSING FOR STUDENT INFORMATION AND TRANSPORTATION DESIGNED BY DPE FOR SCHOOL/GARAGE

TECHNICAL REQUIREMENTS

● LEA

- SNA/SDLC COMPATIBLE
- 4800 BPS COMMUNICATION SPEED
- 3270 EMULATION
- RJE WITH LOCAL PRINT
- LOCAL MICROCOMPUTER(S)
 - DPE OPERATION SYSTEM SELECTION
 - 10 MEGABYTE MINIMUM HARD DISK STORAGE CAPACITY
- LOCAL AREA NETWORK CONTROLLER (OPTIONAL)

● SCHOOL/GARAGE

- LOCAL AREA NETWORK COMMUNICATIONS COMPATIBLE (OPTIONAL)
 - ASYNCHRONOUS DATA TRANSMISSION
- LOCAL MICROCOMPUTER(S)
 - DPE OPERATING SYSTEM SELECTION
 - 10 MEGABYTE MINIMUM HARD DISK STORAGE CAPACITY

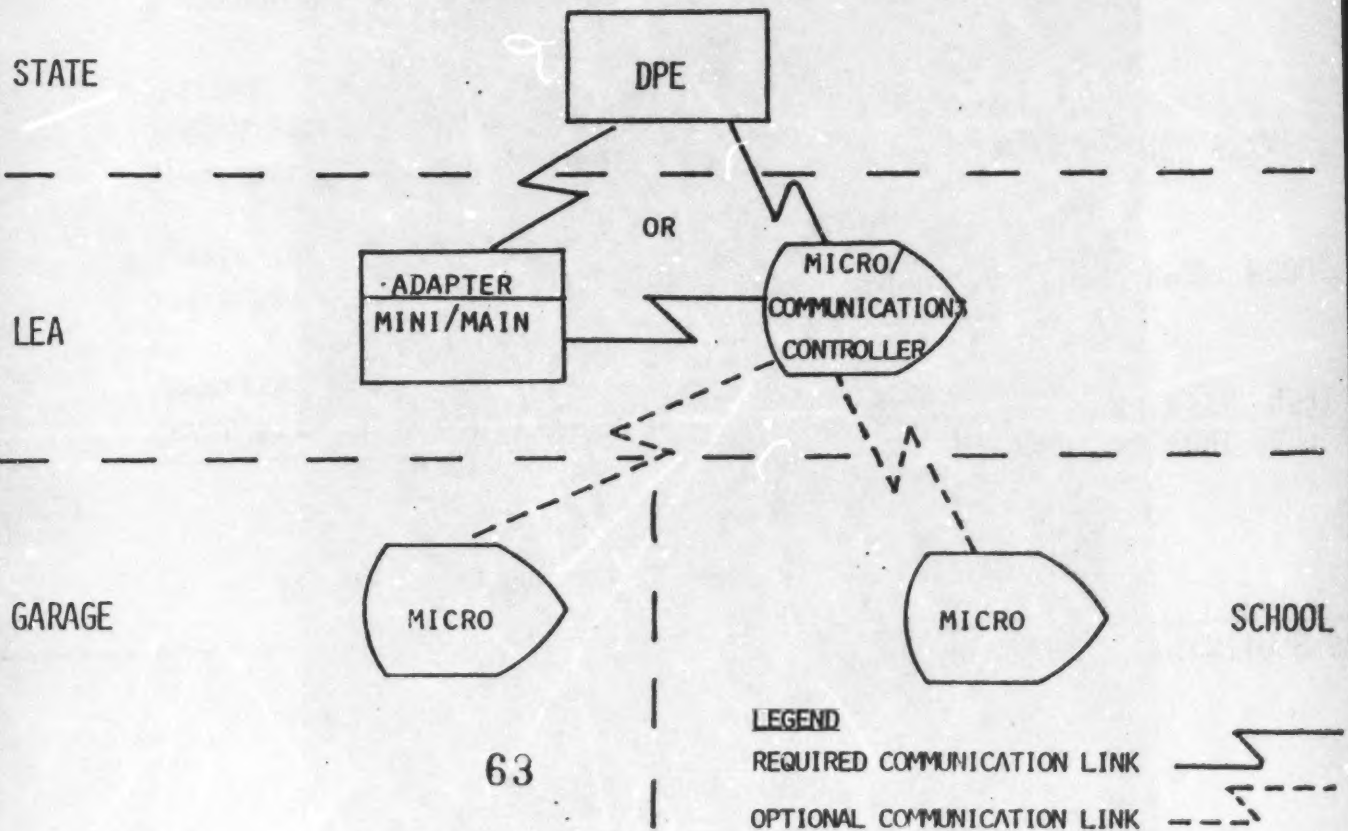
HARDWARE AND COMMUNICATIONS STRATEGY

PRESENT HARDWARE AND COMMUNICATIONS ENVIRONMENT

<u>PRESENT ENVIRONMENT GROUP</u>	<u>GROUP DESCRIPTION</u>	<u>NO. OF UNITS</u>	<u>HARDWARE AND EQUIPMENT</u>
1	STATE NETWORK COMMUNICATIONS COMPATIBLE SYSTEMS	9	IBM S/34, 3083, 4331, 4341
2	STATE NETWORK COMMUNICATIONS CONVERTIBLE SYSTEMS	65	BURROUGHS B90, B900, B800, B2700, B6800
3	STATE NETWORK COMMUNICATIONS NONCOMPATIBLE, NONCONVERTIBLE SYSTEMS	12	IBM S/3, S/32; NCR 8XXX; HONEYWELL 2020
4	NONCOMPUTERIZED SYSTEMS	56	VARIOUS ACCOUNTING MACHINES, MANUAL
	TOTAL	<u>142</u>	

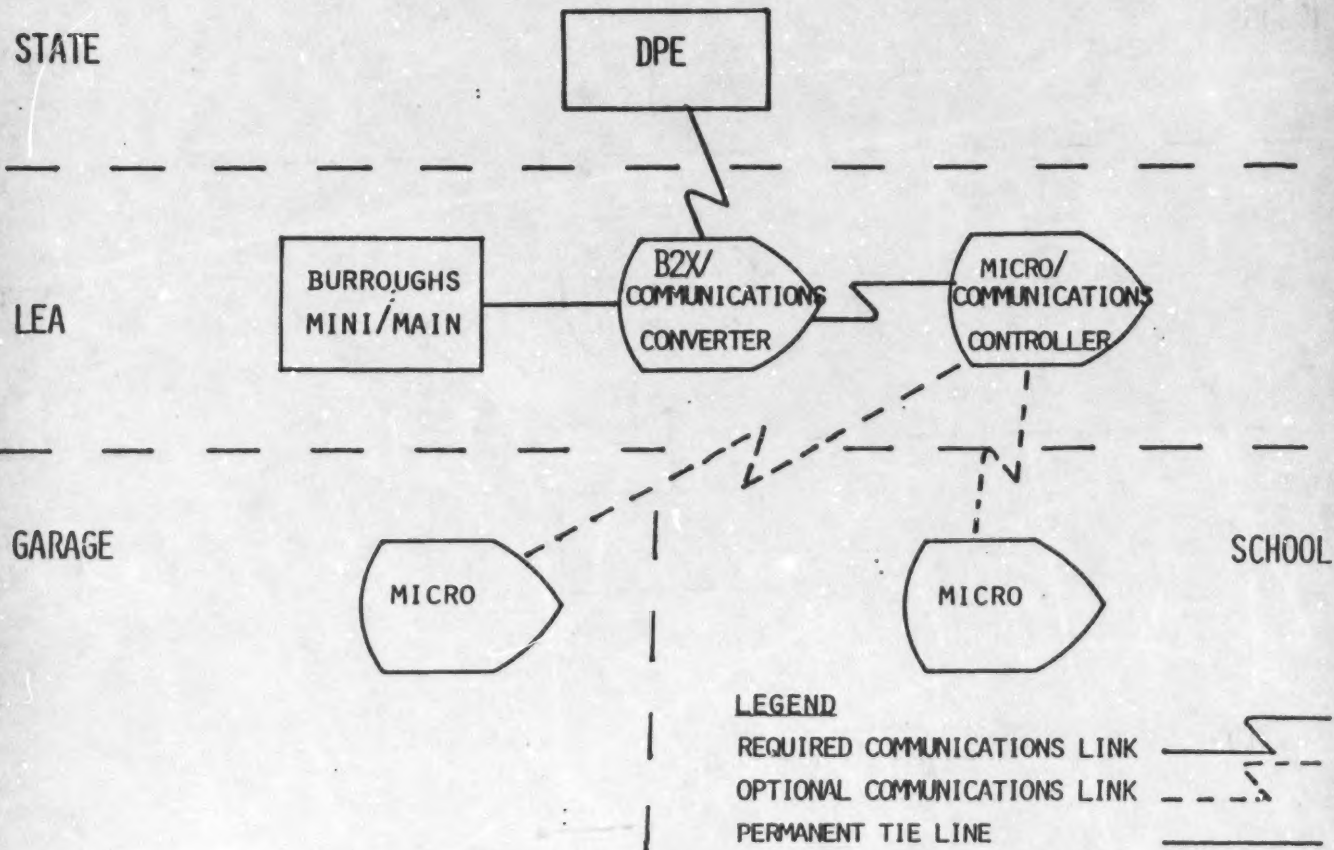
HARDWARE AND COMMUNICATIONS STRATEGY

STRATEGY A



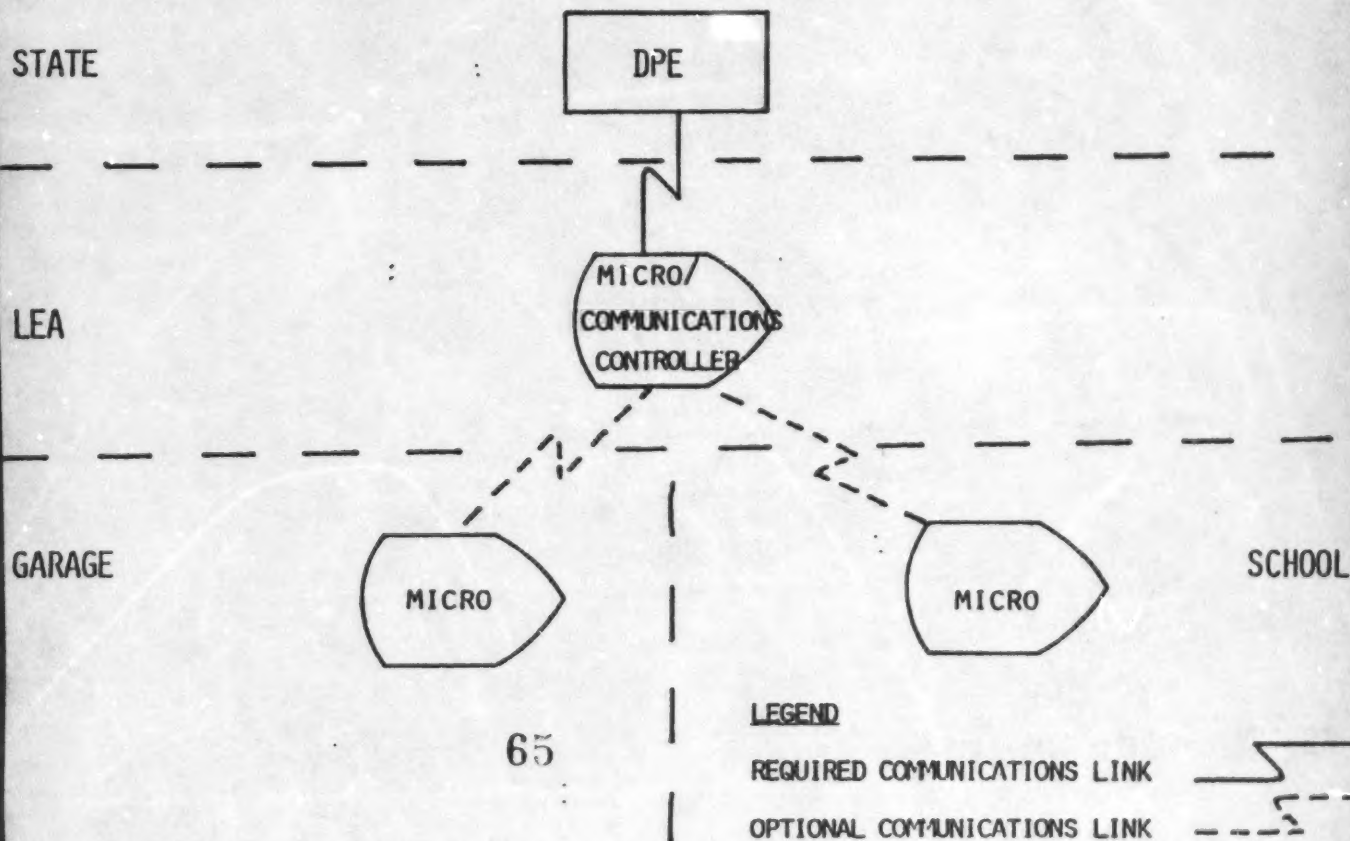
HARDWARE AND COMMUNICATIONS STRATEGY

STRATEGY B



HARDWARE AND COMMUNICATIONS STRATEGY

STRATEGY C



HARDWARE AND COMMUNICATIONS STRATEGY

HARDWARE AND COMMUNICATIONS STRATEGY SUMMARY

PRESENT ENVIRONMENT GROUP	SUGGESTED HARDWARE & COMMUNICATION STRATEGY	REPLACEMENT SYSTEMS HARDWARE	REQUIRED NEW SYSTEMS HARDWARE
1	A	NONE	COMMUNICATIONS ADAPTER LOCAL NETWORK CONTROLLER (OPTION) MICRO(S)
2	A OR	MINI OR MAINFRAME	COMMUNICATIONS ADAPTER LOCAL NETWORK CONTROLLER (OPTION) MICRO(S)
	B OR	NONE	COMMUNICATIONS CONVERTER LOCAL NETWORK CONTROLLER (OPTION) MICRO(S)
	C	MICRO	LOCAL COMMUNICATIONS CONTROLLER (OPTION) MICRO (OPTION)

E-VIII

HARDWARE AND COMMUNICATIONS STRATEGY

HARDWARE AND COMMUNICATIONS STRATEGY SUMMARY (CONTINUED)

PRESENT ENVIRONMENT GROUP	SUGGESTED HARDWARE & COMMUNICATION STRATEGY	REPLACEMENT SYSTEMS HARDWARE	REQUIRED NEW SYSTEMS HARDWARE
3	A OR	MINI/ MAINFRAME	COMMUNICATIONS ADAPTER LOCAL COMMUNICATIONS CONTROLLER (OPTION) MICRO(S)
	B OR	MINI/ MAINFRAME	COMMUNICATIONS CONVERTER LOCAL COMMUNICATIONS CONTROLLER (OPTION) MICRO(S)
	C	MICRO	LOCAL NETWORK CONTROLLER (OPTION) MICRO (OPTION)
4	A OR	NONE	MICRO(S)/MINI/MAINFRAME COMMUNICATIONS ADAPTER LOCAL NETWORK CONTROLLER (OPTION)
	B OR	NONE	MICRO(S)/MINI/MAINFRAME COMMUNICATIONS CONVERTER LOCAL NETWORK CONTROLLER (OPTION)
	C	NONE	MICRO(S) LOCAL NETWORK CONTROLLER (OPTION)